Exposure and the impact on attitudes of the 2019-20 Australian Bushfires

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Abstract

The bushfires that occurred over the 2019/20 Australian spring and summer were unprecedented in scale and wide in their geographic impact. Between 20 January and 3 February 2020, the ANU Centre for Social Research and Methods and the Social Research Centre collected data from more than three thousand Australian adults about their exposure to the bushfires, as well as a range of other attitudes and beliefs. We estimate that the vast majority of Australians (78.6 per cent) were impacted in one way or another either directly, through their family/friends, or through the physical effects of smoke. Furthermore, we estimate that around 2.9 million adult Australians had their property damaged, their property threatened, or had to be evacuated. This is the first estimate of self-reported impacts on that scale from a nationally representative, probability-based survey. Our survey findings also show that subjective wellbeing amongst the Australian population has declined since the start of spring 2019, people are less satisfied with the direction of the country, and have less confidence in the Federal Government. People are more likely, however, to think that the environment and climate change are issues and a potential threat to them, with a significant decline in the proportion of people who support new coal mines. By linking individuals through time, we are also able to show that some of these changes are attributable to exposure to the bushfires.

Executive summary

The 2019/20 Australian bushfires were unprecedented in scale, global in impact, and appear to have had wide ranging political and attitudinal impacts. In the January 2020 ANUpoll, the ANU Centre for Social Research and Methods and the Social Research Centre collected data from more than three thousand Australian adults about their exposure to the bushfires that occurred across the spring and summer of late 2019 and into early 2020. We also asked about a range of attitudes towards the environment, institutions, and political issues. Data from the January 2020 ANUpoll was able to be linked to previous polls at the individual level.

The survey found widespread exposure to the 2019/20 spring and summer bushfires. Around 14.4 per cent of the adult population reported that they were directly exposed either through their property being damaged, their property being threatened, or having to be evacuated. This equates to around 2.9 million adult Australians.

Around 77.8 per cent of the population reported that they were indirectly exposed, by having a friend or family member that had property damage; friend/family that had property threatened; had their travel/holiday plans affected; were exposed to the physical effects of smoke; or felt anxious or worried. This equates to around 15.4 million adults.

In one form or another, the vast majority of Australians feel that the 2019/20 spring and summer bushfires impacted on them in one way or another.

Apart from living outside a non-capital city, there were no demographic or socioeconomic variables that predicted direct exposure. It appears to have been an 'exogenous shock', truly random with respect to individual's demographic and social backgrounds.

There were, however, large associations with reporting indirect exposure. Females and those aged 18 to 24 had a higher probability than comparison groups. Those who have not completed Year 12 or who lived in the more disadvantaged neighbourhoods all reported lower levels of indirect exposure.

Rather than direct exposure, the strongest predictor of being anxious or worried due to the bushfires was a person's friend or family having their home or property threatened. When controlling for other forms of bushfire exposure, males and those who live in non-capital cities were also less likely to report anxiety or worry.

By comparing our findings with previous surveys, we found significant change through time in a range of attitudes and beliefs.

Australians were far less satisfied with their lives and with the direction of the country than they were prior to the bushfires, with large changes between October 2019 and January 2020. We estimate that 59.5 per cent of adult Australians were either satisfied or very satisfied with the way the country is heading in January 2020, a significant decline from 65.2 per cent in the October 2019 ANUpoll. On a range of 0 to 10, life satisfaction in January 2020 was 6.90, also a decline since the October 2019 value of 7.05.

Politically, there was quite strong disapproval for the Federal Government's handling of the bushfires, with particular disapproval for Prime Minister Scott Morrison. The bushfires also appear to have had an effect on confidence in the Federal Government. In January 2020, only 27.3 per cent of respondents reported that they were confident or very confident in the government. This was a decline by 10.9 percentage points from October 2019. Confidence in other institutions was quite stable over the period, and higher than for the Federal

Government. That is, 40.4 per cent had confidence in the State/Territory Government where they lived, 48.8 per cent of the population had confidence in the public service, 73.8 per cent had confidence in the police. The highest level of confidence was for organisations responsible for firefighting in regional or rural areas, with 93.0 per cent reporting confidence in these state-based institutions.

Between October 2019 and January 2020 there was a significant and substantial decline in the per cent of people who said they would vote for the Coalition if an election was held that day. From 40.4 per cent in October 2019 saying they would vote for the Coalition to 34.8 per cent in January 2020. Not all of this would translate into an improvement in two-party preferred terms, as the largest increase between October 2019 and January 2020 was for those who would vote for a party separate from the Coalition, Labor, or the Greens.

In the January 2020 poll, respondents were also asked directly about their views on Party Leaders. For Scott Morrison, the average score was 3.92 out of 10, indicating a net negative view of the Prime Minister. This was a significant and substantial decline from the net positive view of 5.25 when the question was asked in June 2019. For Leader of the Opposition Anthony Albanese, the average score in January 2020 was 5.04, a small but still significant increase from 4.87 in June 2019

There was also a general increase in the predicted impact and seriousness of a range of environmental issues, over both the short and the long term. There were far more people who reported aspects of the environment as the most important issue or second most important issue facing Australia in January 2020 compared to October 2019 (49.7 per cent compared to 41.5 per cent), with an additional 10.2 per cent reporting fires, natural disasters or extreme weather as the most or second most important issue, responses that were close to non-existent in October 2019.

We asked how serious a number of issues were with regards to the environment. For all issues that were asked in 2020 and 2008, apart from soil salinity and erosion, there has been an increase in the proportion of people who think that the particular environmental issues are very serious. The two biggest percentage point increases were for loss of native vegetation or animal species or biodiversity (a 13 percentage point increase) and drought and drying (a 9 percentage point increase). While respondents weren't asked about bushfires in 2008, in January 2020, 82.0 per cent of the sample thought they were 'very serious.'

There was an even larger increase (over the same time period) in the proportion of people who feel that global warming/climate change will have a specific effect on them. 72.3 per cent of those who were asked said that global warming was a very serious or fairly serious threat, a very large increase from the 56 per cent of respondents who said so in 2008. Furthermore, the biggest increase was for those who said it was a very serious threat, increasing from 20 per cent in 2008 to 33 per cent in 2020.

The January 2020 ANUpoll asked respondents 'In your opinion, should the Government allow the opening of new coal mines?' with only 37.0 per cent of respondents answering certainly yes or probably yes. This was a significant and substantial decline from 45.3 per cent of respondents who answered yes when the same question was asked in June 2019.

Geography is important when it comes to environmental issues, with those in non-capital cities less likely to see global warming/climate change as an issue or threat, and more supportive of new coal mines. But, these differences are not as important as we might assume. Of the three

main environmental questions we asked in the January 2020 ANUpoll, the majority of respondents in non-capital cities have the same view as the majority of respondents in capital cities. Specifically, more than half of those who live in non-capital cities think that global warming or the greenhouse effect is very serious, almost two-thirds think global warming will be a threat to them, and only two-fifths think that there should be new coal mines.

By exploiting the longitudinal nature of the Life in Australia panel, we were able to look at individual change through time. There was no statistically significant difference in the change in life satisfaction between October and January between those who reported either direct or indirect exposure to bushfires and those who did not. There was, however, a significant association between exposure to the bushfires and change in confidence in government and change in satisfaction with the direction of the country. Those who were exposed reported a greater decline.

In total, 20.2 per cent of linked respondents said that they would vote for a different party in January 2020 compared to October 2019, a similar level of intra-election voter volatility observed over similar periods using the Life in Australia panel in the past. Of those who did change from saying they were going to vote for the Coalition, 43.9 per cent said they would vote Labor in January 2020, 14.3 per cent said they would vote for the Greens, 24.7 per cent said they would vote for an 'Other' party, and 17.1 per cent did not know who they would vote for.

There is some weak evidence that those who were directly exposed to the bushfires were more likely to change their vote from the Coalition. More generally, females were more likely to change their votes from the Coalition (relative to males). Those at the upper end of the age distribution (particularly those aged 75 years and over) were less likely to have changed their vote from the Coalition, as were those who had a degree. Those who live in a non-capital city were far more likely to have changed their vote from the Coalition, with an estimated probability more than twice as large as those in capital cities (all else being equal) – 21.2 per cent compared to 10.4 per cent.

Indirect exposure to the bushfires was associated with a significant decline in the likeability of Prime Minister Scott Morrison between June 2019 and January 2020. Other factors that were associated with a change in likeability were age (younger people had a greater decline), country of birth (those born overseas had a greater decline), and language spoken at home (non-English speakers had a greater increase).

While there has been an overall decline in support for new coal mines, that does not appear to have been driven by exposure to bushfires. If anything, among those who supported new coals mines in June 2019, those who subsequently had direct exposure to the bushfires were more likely to support new coal mines than those who didn't have direct exposure. In absolute terms, the greatest drop in support for new coal mines was amongst those who voted for the Coalition in May 2019 – from 72.2 per cent support in June 2019 to 57.1 per cent in January 2020.

1 Introduction and overview

The bushfires that occurred over the 2019/20 Australian spring and summer were unprecedented in scale, global in impact, and appear to have had wide ranging political and attitudinal impacts. At the time of writing, more than 11 million hectares (110,000 sq km or 27.2 million acres) have been burnt[1] and according to the Australian Academy of Science,[2] Australia appears to have lost over a billion birds, mammals and reptiles, with additional loss of life of insects, amphibians and fish.

While the loss of human life in the current bushfire season has not been as large as with the worst fires that have occurred in Australia's history, at least 33 people have been killed. Previous natural disasters have resulted in significant physical and emotional trauma beyond the loss of life (Bryant, Waters et al. 2014), with media reports[3] giving an early indication that the current fires may have similar effects. There was also significant property damage, with almost 3,000 houses destroyed, and much more property damaged or threatened.[4]

A number of initial polls of public opinion related to the bushfires and the political ramifications are beginning to emerge. In the 12 January Newspoll, Labor had taken a slight lead over the Coalition in two-party preferred terms (51 to 49) for the first time since prior to the May 2019 election. By 2 February , this lead had widened to 52 to 48 in favour of Labor.

A number of specific polls on the fires have also been published. The Australia Institute (2020) published data (with a sample size of 1,033, conducted on the opt-in YouGov panel between 8 and 22 January) on self reported impacts of the fires and views on climate related issues, making some comparisons with previous surveys on related issues. They found relatively high levels of reported impacts, with the most common being people changing their routine (33 per cent), with more severe impacts (missing work, home or property being unsuitable to live in) having relatively low incidence (8-9 per cent).

A separate report on the poll from the Australia Institute also found that there was a 10 percentage point increase in those who were very concerned about climate change (from 37 per cent in July 2019 to 47 per cent in January 2020) and a 14 percentage point increase in those who said that we are experiencing a lot of the impacts of climate change (The Australia Institute (2020). It should be noted though that much of that change appears to have come from a decrease in those who thought we were experiencing a little of the impacts of climate change, rather than those who thought we were experiencing not very much or not at all (which stayed relatively stable).

While potentially indicative and highly informative, all of the existing published public opinion suffer from one or more important limitations. Sample sizes tend to be small;

[1] https://www.bbc.com/news/world-australia-50951043
[2] https://www.science.org.au/news-and-events/news-and-media-releases/australian-bushfires-why-they-are-unprecedented
[3] https://www.smh.com.au/politics/nsw/andrew-constance-fears-for-community-s-mental-health-after-bushfire-disaster-20200203-p53xco.html
[4] https://www.theguardian.com/environment/ng-interactive/2020/feb/11/counting-the-cost-of-australias-summer-of-dread

representativeness of the samples are mixed; they are commissioned and reported on by organisations with pre-existing political agendas (some pro- some anti-environmental policy); do not include validated measures; or are relatively early in the bushfire season. Furthermore, there is currently no public opinion data that is based on a longitudinal sample, which would allow pre-existing attitudes and beliefs to be held constant when looking at the effect of direct or indirect exposure to the bushfires on attitudes or measures of wellbeing. The aim of this paper is to fill this gap with a unique and targeted dataset.

In the January 2020 ANUpoll (Biddle 2020), the ANU Centre for Social Research and Methods and the Social Research Centre collected data from more than three thousand Australian adults about their exposure to the bushfires that occurred across the spring and summer of late 2019 and into early 2020. The data was obtained using a representative sample of 3,249 respondents from the probability sample 'Life in Australia'™ panel (Kaczmirek, Phillips et al. 2019). Interviews commenced on 20 January 2020, and continued for a two-week collection period. More details on the survey are given at the end of the paper.

2 Exposure to bushfires

There are two ways to capture bushfire exposure in the data used in this analysis. An indirect measure that we do not use in this paper is through the postcode of a person's place of usual residence, which we can match against the postcodes identified by the Australian Tax Office as being in the disaster relief area, or against air quality data that is captured through various government and non-government monitoring stations. These geocoded variables will be available for future analysis.

These geocoded variables will identify those who live in areas that were directly or indirectly affected by the fires. Not every individual who lives in a bushfire area is likely to have been directly affected though (the postcodes are geographically quite large), and there are likely to be people who live outside those areas who were either directly or indirectly affected. This could be because of second homes, travel to those areas during bushfire periods (i.e. direct effects), or because they have close family/friends in those areas or were affected by smoke from the fires (i.e. indirect effects).

In this first paper of results from the January ANUpoll, we therefore use a set of variables based on asking people explicitly about a range of exposure measures. Specifically, we asked respondents:

> We would now like to ask you some questions about your experiences with bushfires. Thinking first about the bushfires that have occurred / are currently occurring over this spring and summer in Australia. Which of the following, if any, have you experienced?

We asked about eight forms of exposure, with varying degrees of severity. These are listed below with the labels used in the remainder of the analysis.

a) **Direct damage -** Your home or property (including pets or livestock) has been damaged or destroyed by the fires
b) **Direct threatened -** Your home or property has been threatened but not damaged or destroyed by the fires
c) **Friend/family damage -** The home or property of a close family member or friend has been damaged or destroyed by the fires

d) **Friend/family threatened -** The home or property of a close family member or friend has been threatened but not damaged or destroyed by the fires
e) **Evacuated -** You were advised by emergency services (directly or indirectly via media) to evacuate from the area in which you live or were staying in due to the fires
f) **Travel/holiday -** Your travel or holiday itself, or travel and holiday plans have been affected by the fires
g) **Smoke -** You felt physically affected by smoke from the fires
h) **Anxious or worried -** You felt anxious or worried for the safety of yourself, close family members or friends, due to the fires

It should be kept in mind that there is considerable uncertainty around the estimates based on these questions. First, we do not have a measure of severity and a number of the terms in the questions are open to interpretation (damaged; close family; advised by; affected). Our intention is to undertake a follow-up survey with respondents to identify the severity of the exposure, but for the current survey it should be kept in mind that results are based on the respondents' own interpretation. A second form of uncertainty is the standard errors associated with sample surveys. For all our figures we add 95 per cent confidence intervals around our estimates, and include confidence intervals around the numerical estimates for exposure. However, it is particularly difficult in sample surveys to obtain precise estimates of outcomes with relatively low incidence.

A third form of uncertainty is the timing of the survey. It predated some of the fires (including in and around Canberra), but was also a number of months after the start of the fire season, leading to potential issues of recall bias. Finally, the fires themselves may have impacted on survey response rates. It is difficult to ascertain the size and direction of some of these potential sources of error, though we do not think that any of the conclusions are likely to be affected.

In total, 78.6 per cent reported at least one form of exposure, with Figure 1 giving the percentages for each of the individual types of exposure, as well as the uncertainty around those estimates (as 95 per cent confidence intervals). The most severe form of exposure, having one's home or property damaged or destroyed, was only estimated to have been experienced by 1.0 per cent of the adult population. However, it should be noted that this may be an undercount as survey non-response could have been affected by exposure to the bushfire.[5] Furthermore, this still equates to between 120,000 and 280,000 adults who reported some form of damage from the bushfires (Table 1), with our best estimate being around 200,000 adult Australians directly affected, based on their self reported experience.[6]

[5] This undercount is an area of ongoing analysis, through linking the postcode of usual residence of the total panel population and comparing whether the response rates for this particular survey vary between bushfire effected and non-effected regions. In this initial paper, we control for this undercount by weighting to population benchmarks, including geographic identifiers.

[6] Initial analysis of the geographic location of those who reported that they were directly affected by the bushfires suggests that the majority lived, at the time of recruitment to the panel or most recent update of place of usual residence, in areas that were affected by the fires. There were relatively few respondents who lived outside of the affected areas based on the most recent geographic information, and many of these may have second homes or have subsequently moved into the areas. Future analyses will make greater use of this geographic information.

Combining those who had property damage, property threatened, or had to be evacuated, around 14.4 per cent of the Australian population report at least one of what we could classify as the most severe forms of exposure. This equates to around 2.9 million adults in Australia.

Not surprisingly, the vast majority of people who reported severe or direct exposure also experienced one of the other forms of exposure (94.9 per cent). One of the characteristics of the bushfires over the 2019/20 Australian spring and summer is their very large geographic range, the length of time that they lasted (many have only just been extinguished at the time of this report's publication) and the large amount of smoke haze that spread across some of Australia's largest cities and regional towns. It is perhaps not surprising then that there are many more people who reported indirect exposure, with more than three quarters of the population reporting some other form of indirect or secondary exposure. Looking at individual items, more than half of the adult population (57.0 per cent), or around 11.2 million adults were estimated to have felt physically affected by the smoke from the fires. This exposure undoubtedly varied in its severity, but this highlights the complex economic and public health challenges from the current fires.

The final exposure measure that we ask about in the poll is whether someone felt anxious or worried due to the fires. More than half of Australian adults (53.6 per cent) estimated to have reported that they felt anxious or worried due to the bushfires. This variable in particular is likely to mask a large degree of severity, and there are likely to be important factors that predict the degree of anxiety and worry, conditional on the person's specific experience (a point we return to later in the paper). Nonetheless, it does demonstrate the very wide population coverage of those who had a subject negative experience.

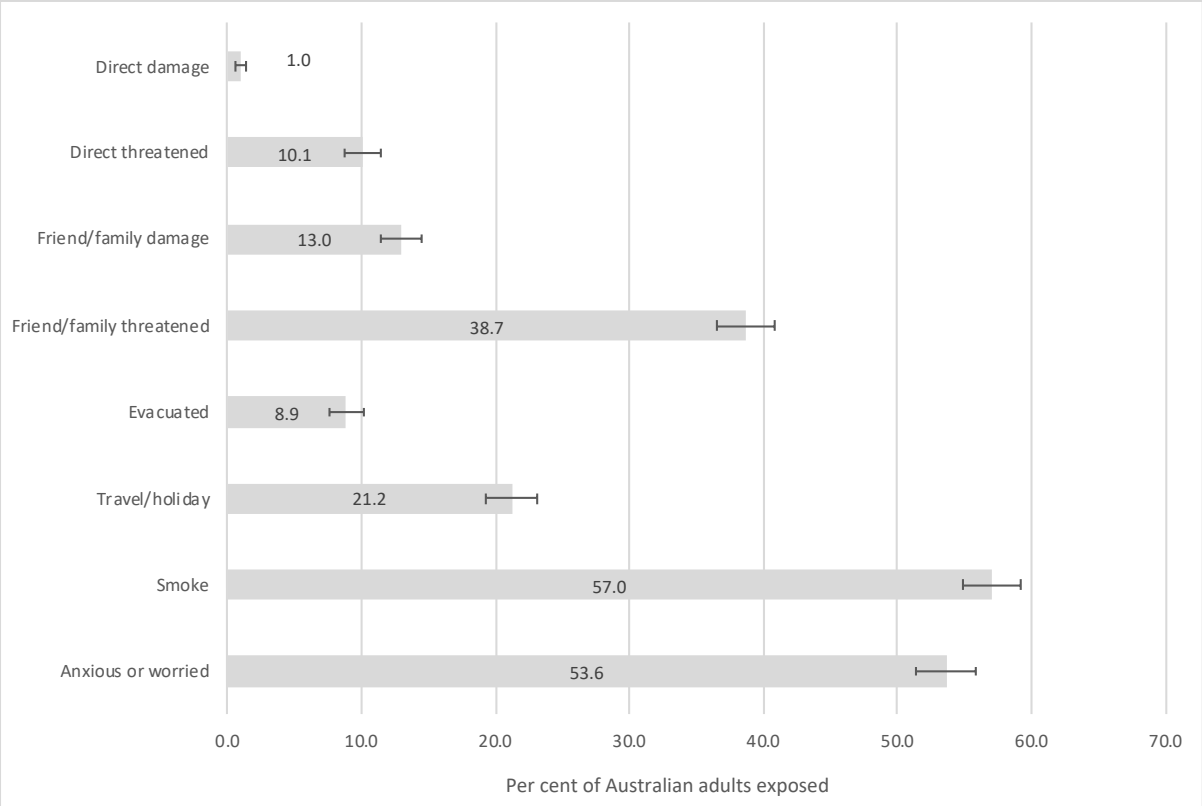
While our estimates suggest a large number of Australian's were exposed to the 2019/20 bushfires, official statistics of the resident population and the number of domestic visitors to the area support these findings. Estimates from the National Visitors Survey of domestic overnight visitors suggests that in 2018 there were almost 19 million domestic overnight visitors to bushfire affected local government areas.[7] If we take the conservative monthly estimate of the annual figure, this equates to 1.58 million domestic visitors for a given month. Combined with an Estimated Resident Population as of 2018 of 1.7 million adults, this suggest that there were likely to be at least 3 million people in bushfire affected areas[8].

Unfortunately, it is not possible in ANUpoll to measure exposure of children to the 2019/20 Australian bushfires. However, even with just being able to look at the adult population, it is clear that the fires had a wide population impact, with most Australians either directly or indirectly affected.

[7] For Local Government Areas affected see: https://www.pm.gov.au/media/immediate-financial-support-bushfire-affected-communities

[8] At this time, it is more difficult to obtain estimates of damage to properties, estimates of property damage. The Insurance Council of Australia reported that on 10 January 2020 11,500 bushfire related insurance claims since September 2019. In a 20 February 2020 ABC story it was reported that Suncorp had over 7,000 claims. These are likely to be a lower bound for property damage as many people would have not yet made claims, and some damage would not be claimed through insurance. Furthermore, property damage estimates need to be multiplied by 2.6 to get an estimate of the number of people in those properties.

Figure 1 Exposure to bushfires and related events



Source: January 2020 ANUpoll.

Table 1 Exposure to bushfires and related events – Percentages and population estimates

Exposure type	Estimated per cent	Estimated number (millions)		
		Lower bound	Point estimate	Upper bound
All	78.6	15.2	15.5	15.9
Severe/Direct	14.4	2.5	2.9	3.2
Indirect/secondary	77.8	15.0	15.4	15.7
Direct damage	1.0	0.1	0.2	0.3
Direct threatened	10.1	1.7	2.0	2.3
Friend/family damage	13.0	2.3	2.6	2.9
Friend/family threatened	38.7	7.2	7.7	8.1
Evacuated	8.9	1.5	1.8	2.0
Travel/holiday	21.2	3.8	4.2	4.6
Smoke	57.0	10.8	11.3	11.7
Anxious or worried	53.6	10.2	10.6	11.0

Source: January 2020 ANUpoll.

It is perhaps not surprising that those who report that they were exposed to one form of negative effect of the fires were more likely to report other types of exposure. We can see this

first by looking at the pairwise correlation between the exposure variables (Table 2). The two types of exposure that have the strongest correlation are being directly threatened oneself and having been evacuated (correlation coefficient = 0.456) and having a friend or family directly threatened and feeling anxious or worried (correlation coefficient = 0.426).

Table 2 Correlation between bushfire exposure items

	Direct damage	Direct threatened	Friend/family damage	Friend/family threatened	Evacuated	Travel/holiday	Smoke	Anxious or worried
Direct damage								
Direct threatened	0.19							
Friend/family damage	0.18	0.25						
Friend/family threatened	0.07	0.27	0.37					
Evacuated	0.13	0.45	0.18	0.17				
Travel/holiday	0.03	0.12	0.20	0.18	0.16			
Smoke	0.02	0.12	0.15	0.19	0.14	0.23		
Anxious or worried	0.06	0.19	0.26	0.40	0.18	0.23	0.33	

Source: January 2020 ANUpoll.

While there is a strong correlation between some of the exposure variables (a point we return to later in this section), one of the interesting findings is that there is very little association between the standard demographic and socioeconomic variables and exposure to the more severe, personal exposure we asked about (those who had property damage, property threatened, or had to be evacuated). In a regression analysis (Table 3), we found no association with sex, age, Indigenous status, and the socioeconomic characteristics of the area in which a person lived. There was a small association with country of birth (those born overseas less likely to be exposed) and education (those with a postgraduate degree more likely to be exposed). There was, however, a strong association with the type of area in which a person lived, with those who lived in a non-capital city more than 50 per cent more likely to have been exposed than those who lived in a capital city (19.6 per cent compared to 11.9 per cent).

There was, however, a number of variables that were associated with indirect or secondary exposure to the fires (which we define as friend/family damage; friend/family threatened; travel/holiday; smoke; anxious or worried). Specifically, in Table 3 we show that controlling for other variables, females and the youngest adults in the sample (aged 18 to 24) were all more likely to report that they had indirect or secondary exposure to the bushfires compared to the base case individual. Those who have not completed Year 12 or who lived in more disadvantaged neighbourhoods all reported lower levels of exposure. Results are presented as marginal effects, or the difference in probability of exposure, holding all other characteristics constant at their baseline value (as described under the table).

There are a number of potential reasons for this variation, all of which are difficult to test with the current data. Past research shows females and the relatively young tend to have higher rates of anxiety in general (McLean, Asnaani et al. 2011), but they may also have greater social networks (in-person and virtual) that increase the extent to which they are exposed to news and information about the bushfires in general, as well as friends and family who may be directly impacted. Those with relatively high rates of education and those who live in relatively advantaged areas have greater engagement with certain forms of media (Campbell 2009) and may also have the economic resources that allow them to purchase second homes (in the areas where bushfires occurred) or would have enabled them to travel to areas that were affected. These determinants of indirect/secondary exposure, conditional on direct exposure are an important area of further analysis.

One of the interesting findings from the analysis is that there was no association between living outside of a capital city and secondary exposure. This highlights, once again, the very wide geographic spread of indirect exposure to the bushfires, through the impacts on friends and family, having one's travel affected, exposure to smoke, or more general anxiety and worry. Unlike other fires in previous years that may have had greater loss of life in concentrated areas, the bushfires of 2019/20 had very wide exposure.

Table 3 Factors associated with bushfire exposure – Severe/direct exposure and indirect/secondary exposure

Variable	Severe/direct		Indirect/secondary	
	Marginal effect	Signific.	Marginal effect	Signific.
Female	-0.006		0.072	***
Aged 18 to 24	0.015		0.125	***
Aged 25 to 34	0.011		-0.002	
Aged 45 to 54	0.006		-0.028	
Aged 55 to 64	0.000		-0.076	**
Aged 65 to 74	0.029		0.011	
Aged 75 plus	0.010		0.030	
Indigenous	-0.025		-0.004	
Born overseas in a main English-speaking country	-0.031	**	-0.006	
Born overseas in a non-English speaking country	-0.029		-0.036	
Speaks a language other than English at home	-0.005		0.055	
Has not completed Year 12 or post-school qualification	0.011		-0.089	**
Has a post graduate degree	0.049	**	0.056	
Has an undergraduate degree	0.021		0.014	
Has a Certificate III/IV, Diploma or Associate Degree	0.044	**	0.040	
Lives in the most disadvantaged areas (1st quintile)	0.009		-0.085	**
Lives in next most disadvantaged areas (2nd quintile)	0.003		-0.029	
Lives in next most advantaged areas (4th quintile)	0.002		-0.021	
Lives in the most advantaged areas (5th quintile)	0.022		0.021	
Lives in a non-capital city	0.065	***	0.012	
Probability of base case	0.093		0.748	
Sample size	3,077		3.077	

Source: January 2020 ANUpoll.

Notes: The base case individual is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

Of the eight questions we asked about exposure to the bushfires, the most subjective was the last – You felt anxious or worried for the safety of yourself, close family members or friends, due to the fires. Being a subjective question does not make it less real, and as will be shown later in this paper, the more indirect measures seem to be more predictive of changes in other attitudes, both towards the environment and towards political issues. We did, however, ask that question last intentionally as we wanted to be able to explicitly capture the relationship between it and the less subjective measures.

Table 4 shows that there is a very strong relationship between other forms of bushfire exposure and a person reporting that they felt anxious or worried. However, in a multivariate model, there were some forms of exposure that had a greater association than others. There was no association between what one might think as the most severe form of exposure – having a home or property (including pets or livestock) that has been damaged or destroyed by the fires. Though, as mentioned, this is a relatively small share of the sample and therefore hard to obtain precise predictions from. All the other forms of exposure had a positive and significant association, with the largest marginal effect for those who had a friend or family member having their home or property threatened. Compared to the base case, and holding all other variables constant, someone with this form of exposure was more than three times as likely to report feeling anxious or worried.

Like when we looked at the broader category of indirect exposure, females (in particular) and the young were more likely to report anxiety or worry. What is quite important from a policy perspective is that those who live outside a capital city (a proxy for living in a regional or rural area) were less likely to report anxiety or worry compared to those who live in a capital city (p-value = 0.051). While this may fit into the stereotype of stoicism we often associate with the bush, it does highlight a potential level of under-reporting or a potential under-accessing of mental health services for some who live in the most exposed areas in Australia (McColl 2007).

Table 4 Factors associated with feeling anxious or worried, including severe/direct exposure and indirect/secondary exposure

Variable	Marginal effect	Signific.
Direct damage	0.038	
Direct threatened	0.090	***
Friend/family damage	0.175	***
Friend/family threatened	0.295	***
Evacuated	0.092	**
Travel/holiday	0.108	***
Smoke	0.177	***
Female	0.098	***
Aged 18 to 24	0.064	
Aged 25 to 34	0.055	*
Aged 45 to 54	0.019	
Aged 55 to 64	-0.041	*
Aged 65 to 74	0.010	
Aged 75 plus	-0.009	
Indigenous	-0.038	
Born overseas in a main English-speaking country	0.025	
Born overseas in a non-English speaking country	0.126	***
Speaks a language other than English at home	-0.017	
Has not completed Year 12 or post-school qualification	-0.029	
Has a post graduate degree	-0.040	
Has an undergraduate degree	-0.022	
Has a Certificate III/IV, Diploma or Associate Degree	0.006	
Lives in the most disadvantaged areas (1st quintile)	0.014	
Lives in next most disadvantaged areas (2nd quintile)	0.029	
Lives in next most advantaged areas (4th quintile)	-0.002	
Lives in the most advantaged areas (5th quintile)	0.045	*
Lives in a non-capital city	-0.032	*
Probability of base case	0.140	
Sample size	3,073	

Source: January 2020 ANUpoll.

Notes: The base case individual did not report any of the forms of exposure; is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

3 Wellbeing and views on the country

There are a number of potential effects of exposure to bushfires, either directly, indirectly through close friends and families, or through exposure to smoke and haze. Experiences of trauma (Bryant, Waters et al. 2014) and public health effects of smoke (Morgan, Sheppeard et al. 2010) are difficult to detect in nationally representative surveys like ANUpoll (due to lack of clinical measures and relatively small samples of people with direct extreme exposure), though they may be collected in subsequent waves of the Life in Australia panel. It is possible, however, to look at the relationship between bushfire exposure and more subjective measures of wellbeing.

At the start of the January 2020 ANUpoll and before any questions on bushfire exposure, we asked respondents 'Firstly, a general question about your views on living in Australia. All things considered, are you satisfied or dissatisfied with the way the country is heading?', with response options of very satisfied; satisfied; neither satisfied nor dissatisfied; dissatisfied; and very dissatisfied. After asking a couple of questions on political views (which we will return to later in this paper) we then asked respondents 'The following question asks how satisfied you feel about life in general, on a scale from 0 to 10. Zero means you feel 'not at all satisfied' and 10 means 'completely satisfied'. Overall, how satisfied are you with life as a whole these days?'

We estimate that 59.5 per cent of adult Australians were either satisfied or very satisfied with the way the country is heading. This is a significant and substantial decline from 65.2 per cent in the October 2019 ANUpoll, the last time the question was asked on the Life in Australia panel. On a range of 0 to 10, life satisfaction in January 2020 was 6.90, also a decline since the October 2019 value of 7.05.[9]

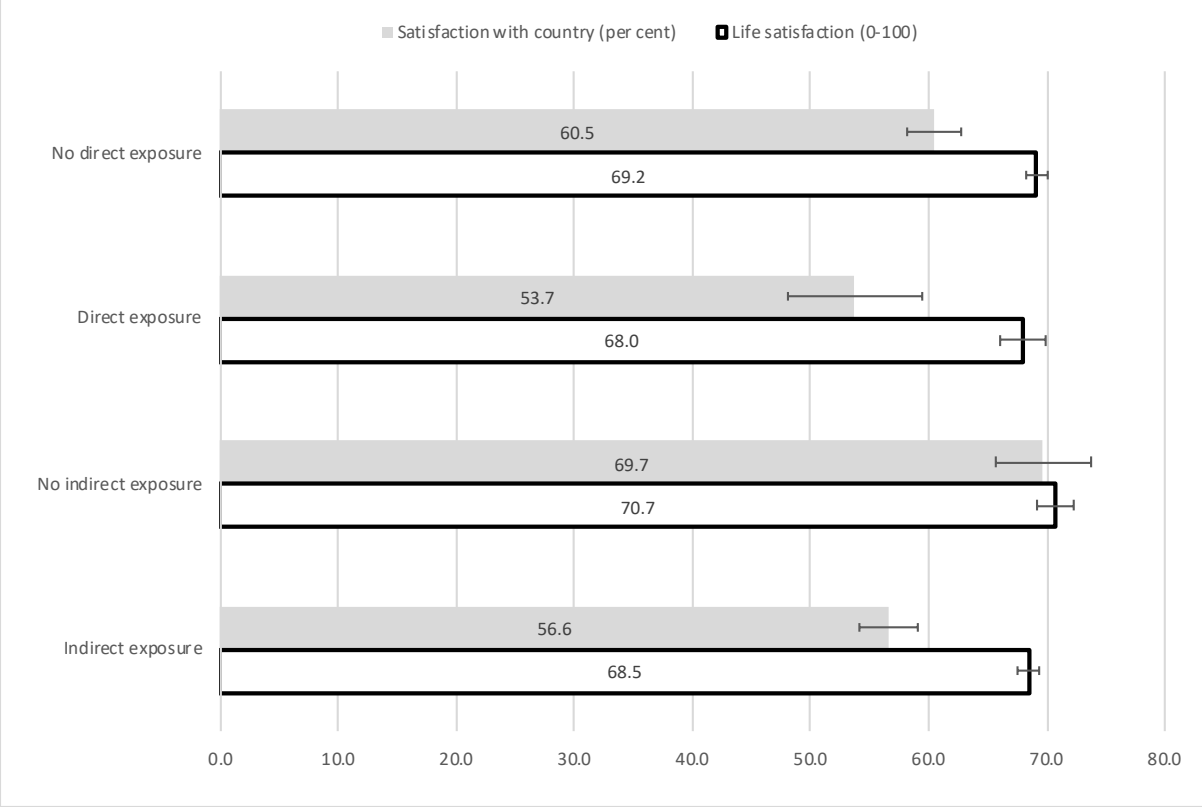
Because of the widespread nature of the fires, as well as the national and international coverage in the media, views on the direction of the country can still be affected by bushfires even if an individual is not directly exposed. There is not, however, a counterfactual Australia that was not exposed to bushfires over the 2019/20 spring and summer that would allow us to detect this national effect. It is possible, however, to look at the relationship between self-reported bushfire exposure and the wellbeing measures. We return to this in a longitudinal sense later in this paper with the linked sample. In this section though, we look at cross-sectional relationships using the full January 2020 sample.

There were some significant differences in satisfaction with the direction of the country and life satisfaction by exposure to the bushfires (Figure 2, with life satisfaction rescaled to 0 to 100). Looking first at differences by direct exposure (those who had property damage, property threatened, or had to be evacuated), those who were directly exposed had lower levels of satisfaction with the direction of the country, but no difference in life satisfaction. For indirect exposure, on the other hand, those who reported indirect exposure (Friend/family damage; Friend/family threatened; Travel/holiday; Smoke; Anxious or worried) had lower rates of both life satisfaction and satisfaction with the direction of the country than those who weren't indirectly exposed.

[9] The standard deviation for Life Satisfaction in January 2020 was 1.82, meaning the change over the three months was a decline of 8.2 per cent of one standard deviation.

We will return to these two issues in the final section of the paper by looking at the relationship between bushfire exposure and change through time in the wellbeing measures, a more direct measure of a causal relationship.

Figure 2 Satisfaction with direction of country and life satisfaction by bushfire exposure



Source: January 2020 ANUpoll.

4 Views on the Government's job

One of the defining characteristics of the most recent bushfire season is the criticism received by the Prime Minister Scott Morrison in particular, and the Commonwealth Government in general. This is in contrast to previous national crises in Australia or abroad where support for leaders and the party in power often grows (Gillman 2010). The response to the 2019/20 bushfires is, however, closer to the criticism of President George W. Bush during and after Hurricane Katrina, with Boin, HART et al. (2010) concluding that 'President George W. Bush received most of the blame for the slow and ineffective response. His attempts to deflect blame (from the 'unforseeability' of the levees being breached through to the failings of state and city officials) only made things worse, creating the impression of an out-of-touch and insensitive president.'

Some of this criticism reflects dissatisfaction with the way in which the Government has handled the causes of the fires or the things that make them more likely (including climate change, but also hazard reduction). However, there has also been criticism of the way the Government handled the fires once they had started, including the decision by the Prime Minister to take and continue (before cutting short by a day) a holiday in Hawaii. This dissatisfaction is reflected in the ANUpoll data through both direct and indirect questions.

4.1 Government handling of the bushfires

Directly, we asked half the sample 'Now thinking about the performance of Scott Morrison during the spring and summer bushfires, how good or bad a job do you think the Government

has done. Would you say a…?', with the options being 1) Very good job 2) Good job 3) Bad job 4) Very bad job. For the other half of the sample, we asked 'Now thinking about the performance of the Government in Canberra during the spring and summer bushfires, how good or bad a job do you think the Government has done. Would you say a…?', with the same response options.

When prompted to think about Prime Minister Scott Morrison specifically, 36.4 per cent of adults Australians thought the Government had done a very bad job, and a further 28.1 per cent though the Government had done a bad job (64.5 per cent disapproval). Only 7.5 per cent thought the Government had done a very good job when prompted to think about Prime Minister Scott Morrison.

When prompted to think about the Government in general, 29.8 per cent thought the Government had done a very bad job and 29.6 per cent thought the Government had done a bad job (59.4 per cent disapproval). Only 8.4 per cent thought the Government did a very good job (when not prompted to think about the Prime Minister).

The differences in disapproval based on whether the question specifically refers to Prime Minister Scott Morrison are statistically significant. However, both are significantly and substantially larger than 50 per cent, showing that there was quite strong disapproval for the Government's handling of the bushfires, with particular disapproval for Scott Morrison.

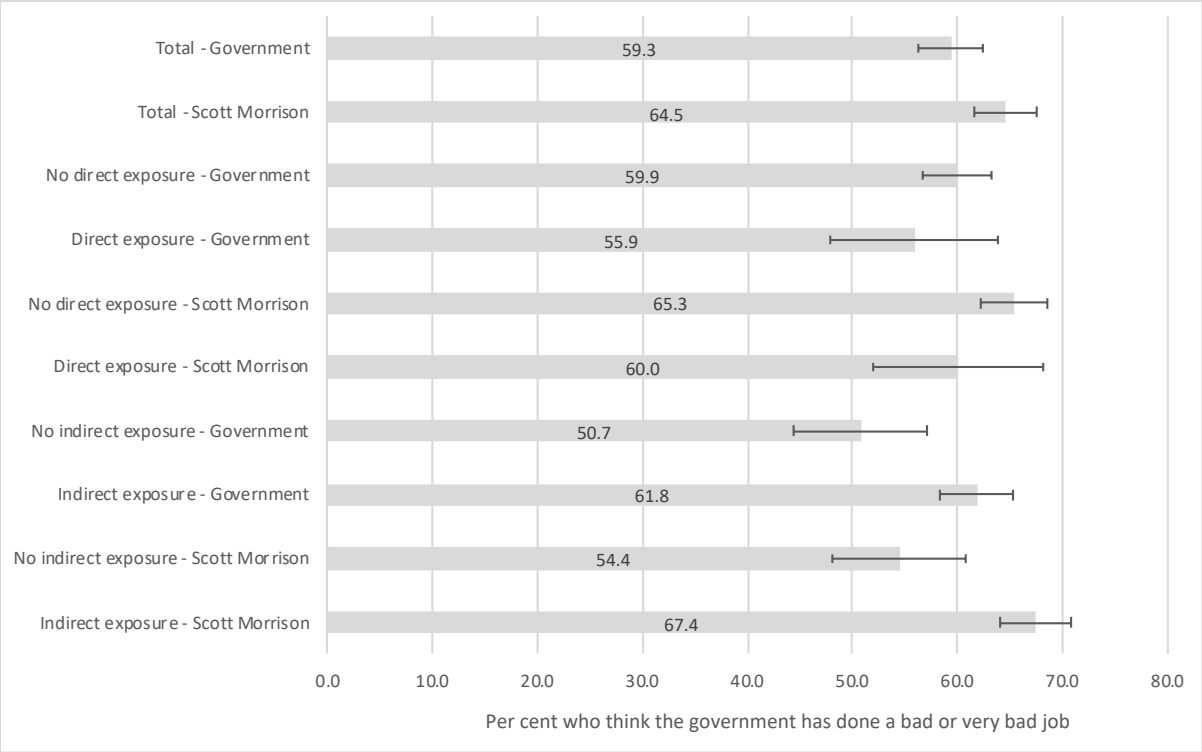
There were large differences in the disapproval of the Government, depending on the person's self-reported exposure to the bushfires. However, the direction and significance of this difference depends on whether the question was framed around Scott Morrison, or whether it was framed around the Government more generally, as well as whether we look at differences by direct or indirect exposure.[10] The relationship is complicated.

As shown in Figure 3, those who had direct exposure to the bushfires were slightly less likely to disapprove of the job the Government has done than those who did not report direct exposure, but this difference was not statistically significant.

Regardless of the framing of the question, there were quite large differences in approval by indirect or secondary exposure. Specifically, when framed around the Government in general, 61.8 per cent of those who reported indirect exposure thought the Government has done a bad or very bad job, compared to 50.7 per cent of those who did not report indirect exposure (a 11.1 percentage point difference). When framed around Scott Morrison, on the other hand, 67.4 per cent of those who reported indirect exposure though that the Government has done a bad or very bad job compared to 54.4 per cent of those who didn't report indirect exposure (a 12.9 percentage point difference).

[10] The bivariate differences (or lack thereof) summarised in Figure 3 hold when included in a multivariate model, controlling for demographic, socioeconomic and geographic characteristics.

Figure 3 Disapproval of Government by exposure



Source: January 2020 ANUpoll.

4.2 Confidence in institutions

It is unclear from the data that we do have as to whether reporting indirect exposure (which has a subjective element to the reporting) was the cause of the disapproval with the Government, or whether the disapproval of the Government led to the reported exposure. By definition, we don't have a pre-exposure measure for the handling of the bushfires to look at change through time. However, we are able to look at change through time in more indirect measures of the Government's job which may be affected by the bushfires.

Specifically, at the start of the survey (and prior to asking about bushfire exposure) we asked respondents 'How much confidence do you have in the following institutions…?' with five institutions asked about[11], and response options being A great deal of confidence; Quite a lot of confidence; Not very much confidence; and None at all. One of the institutions that we asked about was 'The Federal Government in Canberra.'

One of the more urgent issues being analysed within the field of political science (and the social sciences in general) is decline in trust or confidence in government. The long-running Australian Election Study has shown that confidence in the Federal Government has declined substantially over the last few decades (Cameron and McAllister 2019). Other data has shown that low rates of trust are associated with lower rates of democratic participation (Lee and Schachter 2019). Crises like the 2019/20 spring and summer bushfires have the potential to restore some of this trust, if dealt with effectively and transparently. However, the effect appears to have been in the opposite direction.

Figure 4 shows (through the first grey bar) that only 27.3 per cent of respondents reported that they were confident or very confident in the Government, the lowest out of all five

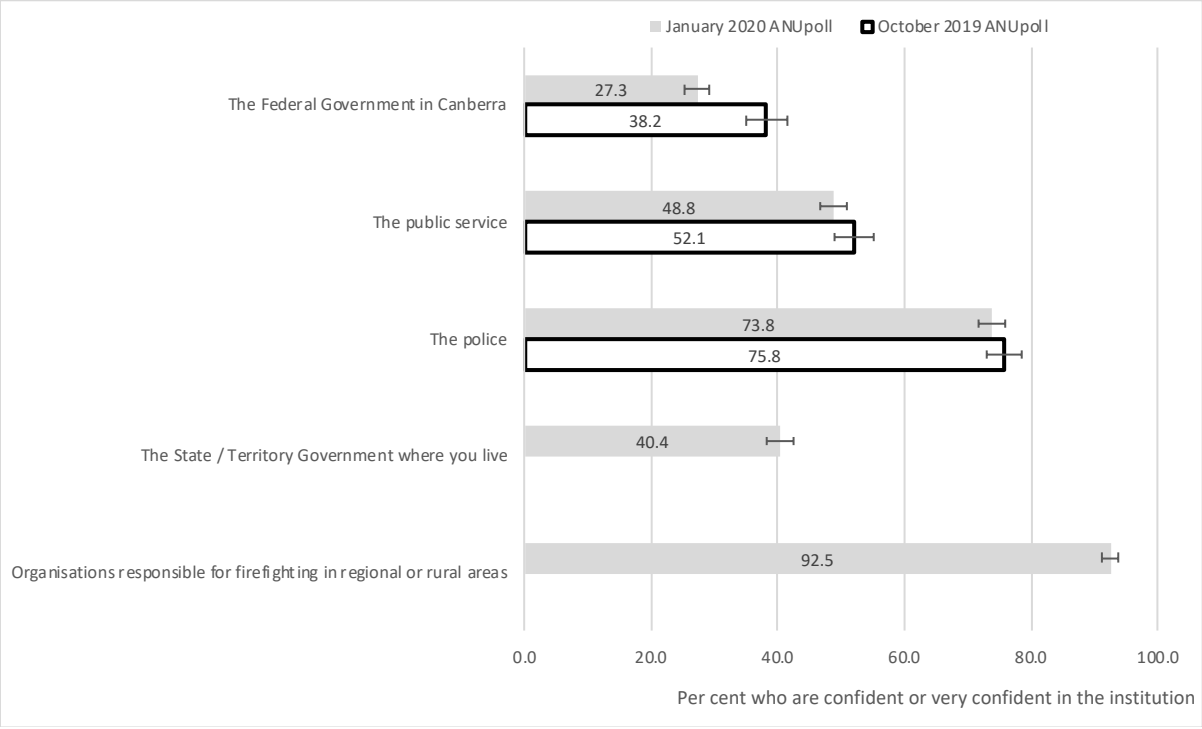
[11] The order in which the institutions were given was randomised.

institutions we asked about. This was a decline by 10.9 percentage points from the last time we asked this question (in October 2019 the hollow bars), a difference that was statistically significant at any sensible level of significance, and almost unprecedented in scale given the very short time difference between the two surveys.

Looking at the remainder of the January 2020 results, respondents were more confident in State/Territory governments (40.4 per cent), the public service (48.8 per cent), and the police (73.8 per cent). The highest level of confidence is 'Organisations responsible for firefighting in regional or rural areas' (92.5 per cent).[12]

Of the other two institutions that we had asked about in October (the public service and the police), there was a small decline in both, (by 3.3 percentage points and 2.0 percentage points respectively). Neither of these two changes, however, were outside of the relevant confidence intervals or statistically significant at the 5 per cent level of significance. While it is not possible to attribute this change directly to the bushfires, it is clear that confidence in the Federal Government has declined quite substantially over the spring/summer, and that this is not just because confidence in all institutions has declined (as shown by relatively the constant views in the other two institutions).

Figure 4 Confidence in institutions, January 2020 and October 2019



Source: January 2020 and October 2019 ANUpolls.

4.3 Voting intentions

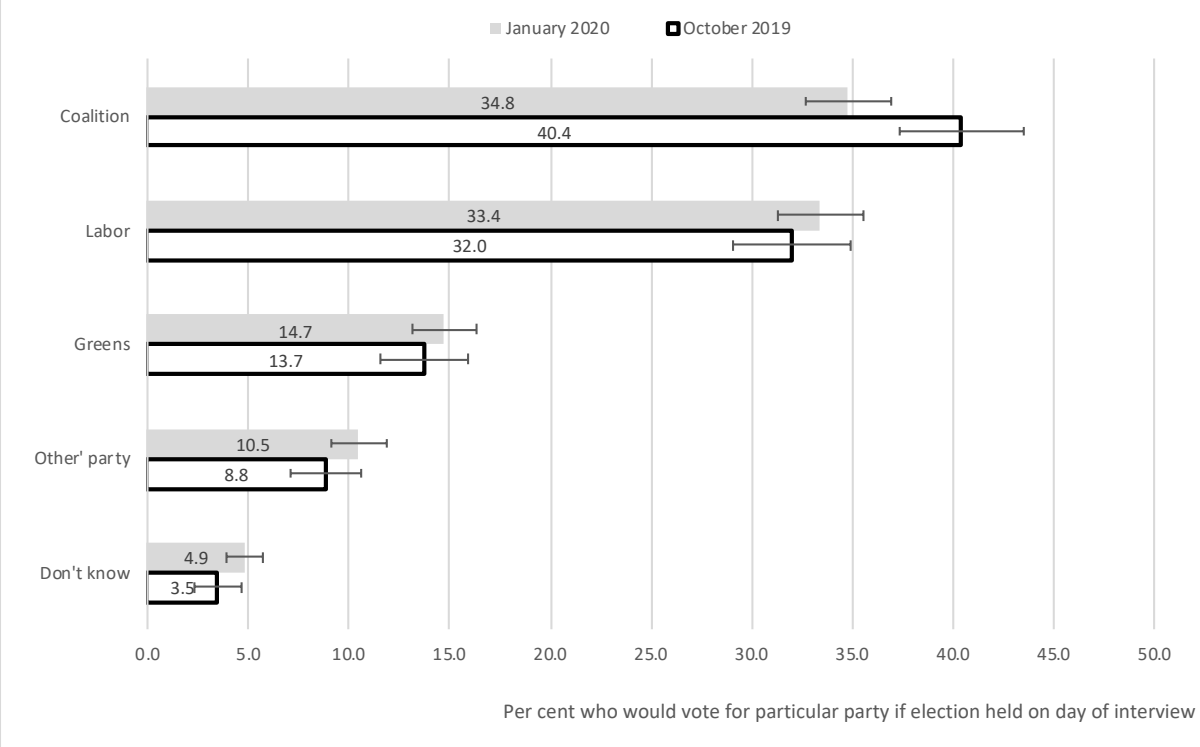
Ultimately, the most important measure from a political party's point of view is who someone is likely to vote for. As mentioned earlier, for the first time since prior to the May 2019 election the Labor party was ahead in the two party preferred Newspoll, and 'If an election was held

[12] When asked about firefighting in regional rural areas, the following examples were given: Rural Fire Service, Country Fire Authority, Country Fire Service, and Bush Fire Brigades.

today, [a] +3.53 swing towards Labor.'[13] In all ANUpolls, we ask respondents 'If a Federal Election for the House of Representatives was held today, which one of the following parties would you vote for?' with Liberal; Nationals; Labor; and Greens as pre-coded options (as well as Liberal National Party in Queensland), and respondents able to specify other parties or report that they do not know or are not sure.

Figure 5 gives the per cent of people who said they would vote for five party groupings when asked in January 2020 including the 'Don't know' category (hollow bars), as well as in October 2019 (the grey bars). Although we do not ask for second or later preferences and do not allocate minor parties to obtain a two-party preferred comparison, comparing the cross-sectional results in October 2019 and January 2020 shows a significant and substantial decline in the per cent of people who would vote for the Coalition if an election was held that day, from 40.4 per cent to 34.8 per cent. It would appear that a very large proportion of that decline was picked up by 'Other' parties, but there were also small increases in the proportion of people who said they would vote Labor and the Greens, albeit increases that were not statistically significant.

Figure 5 Voting intention – October 2019 and January 2020



Source: January 2020 and October 2019 ANUpolls.

One of the characteristics that feeds into voting intentions is views on Party Leaders. In the January 2020 poll, respondents were also asked directly about their views on Party Leaders, with the specific question being 'What do you think of the party leaders? For each party leader, please rate them on a scale from 0 to 10, where 0 means you strongly dislike that leader and 10 means that you strongly like that leader.' For Scott Morrison, the average score was 3.92 out of 10, indicating a net negative view of the Prime Minister. This was a significant and

[13] https://www.theaustralian.com.au/nation/newspoll

substantial decline from 5.25 when the question was asked in June 2019 (McAllister 2019) (McAllister et al. 2019). For Leader of the Opposition Anthony Albanese, on the other hand, the average score in January 2020 was 4.93, a figure that was not significantly different from that immediately after the May 2019 election when Mr Albanese first took on the role of Opposition Leader (4.87).

The June 2019 took place immediately after the 2019 Federal Election, which was won by the Coalition despite being behind in most of the polls leading up to the Election. Scott Morrison had only been Prime Minister for a relatively short period of time at that stage, and a number of other things have occurred since then that may have led to a decline in views towards the Prime Minister. It is not possible, therefore, to directly attribute the decline in support to the Bushfires alone. However, given the size of the decline, the significant criticism that has taken place of the Prime Minister, and the consistent views towards the Opposition Leader, it is likely that some of the decline in support is attributable to the Prime Minister's handling of the fires.

5 Views on the environment

There is significant debate about the specific contribution of different causes to the spring/summer bushfire crises, including the role of arson and hazard reduction.[14] There is a very strong scientific consensus though that climate change or global warming/heating is making such events more likely, last longer, and more intense (IPCC 2014). This is not only because of the direct effect of high temperatures on combustibility during the fire season, but also because of the difficulties of hazard reduction during hotter than average years and the decreased moisture due to prolonged drought (Garnaut 2019).

We asked a number of questions related to the environment in the January 2020 ANUpoll, some of which were repeated from recent surveys, with others repeated from much earlier surveys. In every ANUpoll, we ask respondents 'What do you think is the most important problem facing Australia today?', with a follow-up question of 'And, what do you think is the second most important problem facing Australia today?' These are coded to 37 possible options, held consistent through time, with a final coded category for 'other'.

Using this consistent coding, 49.7 per cent of Australian adults were estimated to think that one of three environmental issues were the most or the second most important issue facing Australia.[15] This was a significant and substantial increase from October 2019, when only 41.5 per cent of respondents thought the environment was the most or second most important issue. In January 2020, however, there was a dramatic increase in the number of people who could not be coded in one of the pre-existing categories, with many of these reporting issues related to bushfires, natural disasters or extreme weather. When these responses are combined with the existing environmental codes, 59.9 per cent of Australians were estimated to have thought that environmental issues or issues related to bushfires were the most or second most important currently facing Australia.

It should of course be kept in mind that two people can both think that environmental issues or bushfires are important issues, and yet disagree on why they are issues or what the response should be. For example, one verbatim response for the first most important issue was 'The bushfire crisis and not taking enough action on climate change.' However, another verbatim

[14] https://www.abc.net.au/news/2020-01-11/australias-fires-reveal-arson-not-a-major-cause/11855022
[15] The specific coded categories were: Environment / global warming; Water management; or Carbon Tax.

response was 'The Greenies. Not letting the cattle and the horses eat the grass to stop these fires.' Clearly, we should not assume that people who think environmental issues or bushfires are important are going to be for particular pro-environment policies.

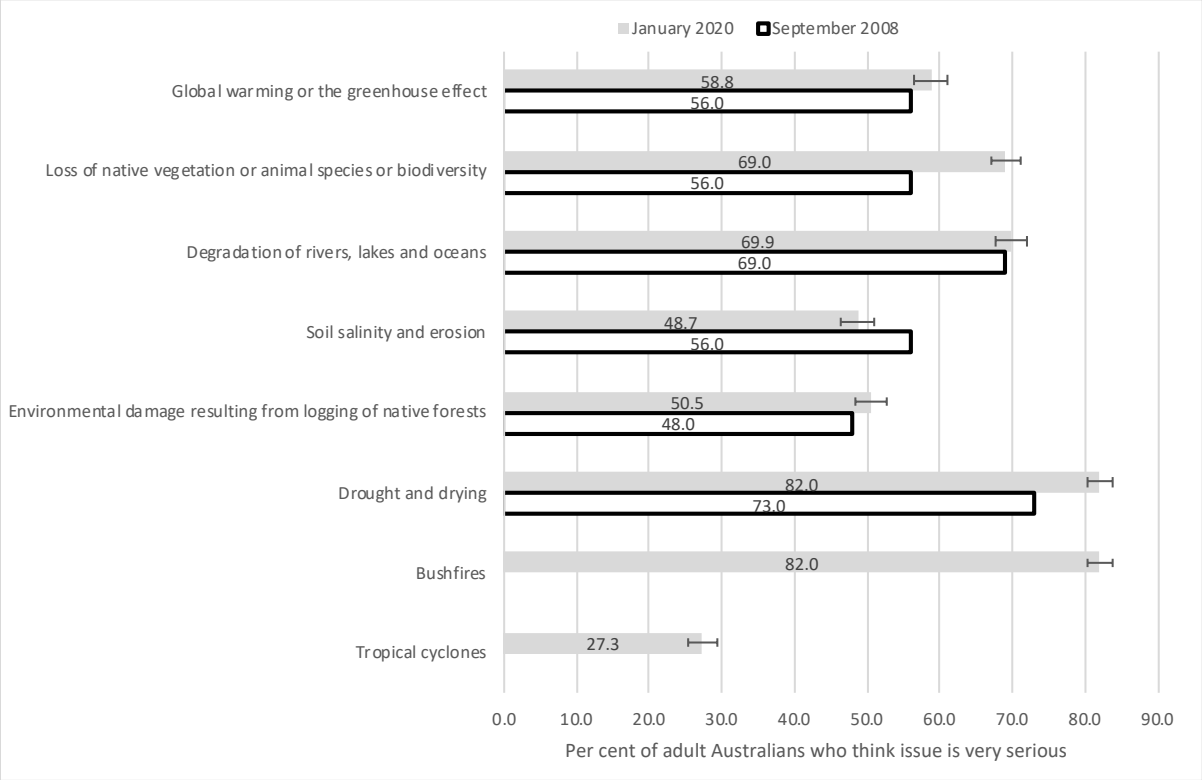
In addition to the questions about most important issues, we asked a number of explicit questions about environmental issues. First, we asked the following question: 'We are now going to ask you some questions about the environment. How serious do you consider each of the following to be for Australia?', with the following eight potential environmental issues:

a) Global warming or the greenhouse effect
b) Loss of native vegetation or animal species or biodiversity
c) Degradation of rivers, lakes and oceans
d) Soil salinity and erosion
e) Environmental damage resulting from logging of native forests
f) Drought and drying
g) Bushfires
h) Tropical cyclones

We provided four potential response options – very serious; somewhat serious; not very serious; and not serious at all. Combining the first two response options, all of the potential issues were rated as being somewhat or very serious by more than three quarters of the population, ranging from 78.6 per cent for tropical cyclones to 98.2 per cent for drought and drying. Clearly, environmental issues are very salient for a very large proportion of Australians. There is, however, more variation in the proportion of people who thought the issues were very serious. Furthermore, by looking at the very serious category only, we are able to make comparisons for the first six of the environmental issues with when the question was last asked in the September 2008 ANUpoll (McAllister 2008), as shown in Figure 6.

For all issues that were asked in both years, apart from soil salinity and erosion, there has been an increase in the proportion of people who think that the particular environmental issues are very serious, though not all of these changes were statistically significant. The two biggest percentage point increases were for loss of native vegetation or animal species or biodiversity (a 13.0 percentage point increase) and drought and drying (a 9.0 percentage point increase). Both of these may have been exacerbated or made more salient by the bushfires.

Figure 6 Per cent of population who think specific environmental issues are serious – January 2020 and September 2008



Source: January 2020 and October 2019 ANUpolls.

There were no significant differences in belief in the seriousness of any of the environmental issues between those who reported direct exposure to the bushfires and those who did not. There were, however, large differences between those who reported indirect exposure and those who did not, with the former tending to be far more likely to feel that the environmental issues are serious. These results hold when we control for the standard demographic, socioeconomic and geographic variables we include in Table 3.

It might seem counterintuitive that those who had the greatest, or at least most severe, exposure to the bushfires did not have as strong a view on issues related to the environment, and bushfires in particular. However, there are a number of potential explanations including pre-existing beliefs. We attempt to control for this later in the paper with the longitudinal data. There is also public debate about the link between bushfires and climate change, even if the scientific consensus is that the latter definitely increases the probability of the former. However, the fact that direct bushfire exposure is not more closely related to environmental issue salience fits in the general literature including on fear of crime and fear of terrorism that those who are most directly impacted aren't always those who are most concerned (Ditton and Farrall 2017).

While there has only been a modest increase in the proportion of people who think that 'global warming or the greenhouse effect' is a serious issue, there was a much larger increase in the proportion of people who feel it will have a specific effect on them. In 2008, respondents were asked 'Do you think that global warming will pose a serious threat to you or your way of life in your lifetime?' We asked the same question of 70 per cent of respondents in the January 2020 poll (2,269 respondents) with 72.3 per cent of those who were asked saying that global

warming posed a very serious or fairly serious threat, a very large increase from the 56 per cent of respondents who said so in 2008.[16] The biggest increase was for those who said it was a very serious threat, increasing from 20 per cent in 2008 to 33.0 per cent in 2020.

While not directly related to bushfires, there are many who argue that Australia needs to reduce the level of coal mining and therefore coal mines, in order to decrease CO_2 emissions (including through coal that is exported) and slow the rate of temperature increase, which is directly related to bushfire activity. The January 2020 ANUpoll asked respondents 'In your opinion, should the Government allow the opening of new coal mines?' with only 37.0 per cent of respondents answering certainly yes or probably yes. This was a significant and substantial decline from 45.3 per cent of respondents who answered yes when the same question was asked in June 2019, immediately following the 2019 Australian Federal Election (McAllister 2019).

At the start of the bushfire season and before the eventual scale and level of destruction was reached, there was considerable heated debates between politicians and across the media about the extent to which concern with regards to climate change and its impact on bushfires was shared by those outside of the most urban parts of the country. This was exemplified in November 2019 with the Deputy Prime Minister and leader of the National Party of Australia stating that climate change concerns were an exclusive focus of 'inner-city raving lunatics' and that 'We've had fires in Australia since time began, and what people need now is a little bit of sympathy, understanding and real assistance - they need help, they need shelter.'[17]

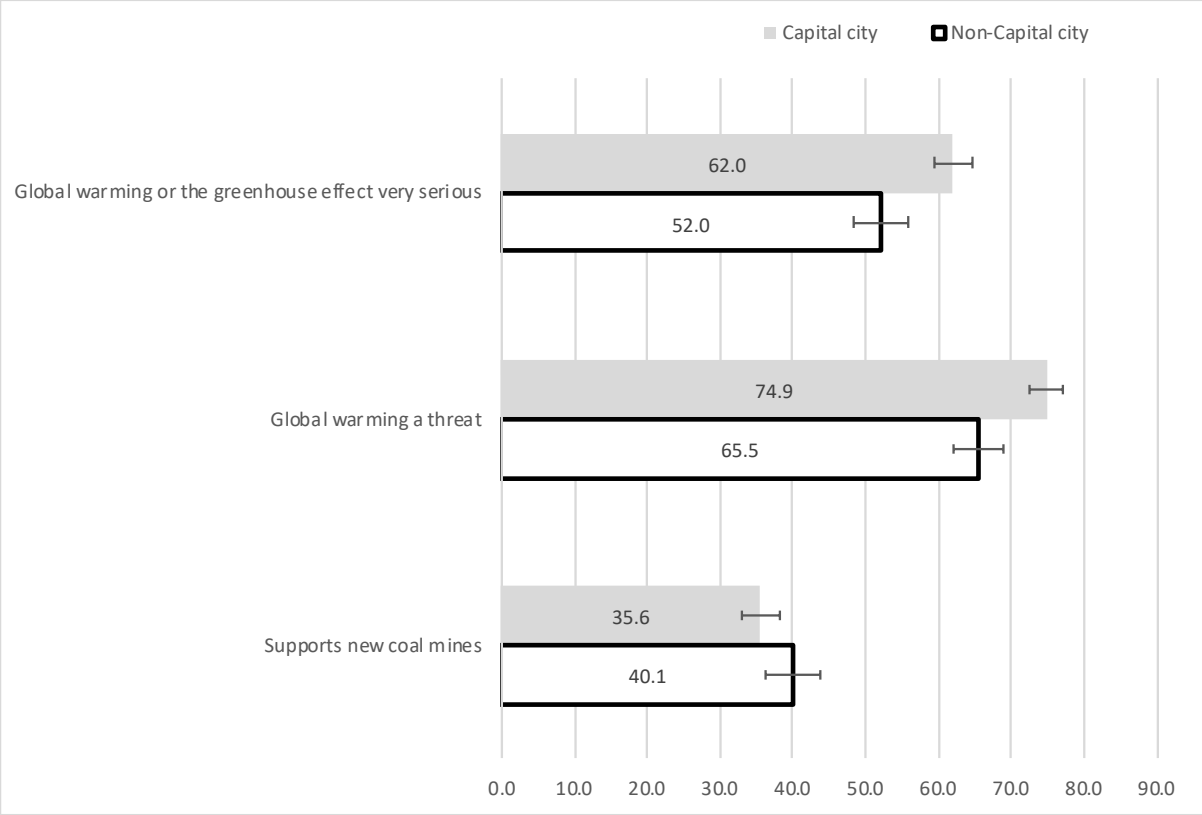
There are clearly differences in views towards the environment and mining by geography in Australia with those in non-capital cities less likely to see global warming/climate change as an issue or threat, and more supportive of new coal mines. However, the data from the January 2020 ANUpoll suggests that these differences are a matter of degrees, rather than direction.

While a capital city/non-capital city comparison is not always the best split by geography (there are highly urban non-capital cities like Newcastle and Geelong, or relatively remote capital cities like Darwin), it is one binary measure to split the population by geography. As shown in Figure 7, of the three main environmental questions we asked in the January ANUpoll, the majority of respondents in non-capital cities have the same view as the majority of respondents in capital cities. Specifically, more than half of those who live in non-capital cities think that global warming or the greenhouse effect is very serious, almost two-thirds think global warming will be a threat to them, and only two-fifths think that there should be new coal mines.

[16] Of the remainder of the sample, 15 per cent were asked about 'climate change' rather than 'global warming', with 73.8 per cent saying that it was a fairly or very serious threat. The other 15 per cent were asked about 'global heating' rather 'global warming', with 67.3 per cent saying it was a fairly or very serious threat. This is an important area of ongoing research on how framing effects views. It would appear that, counter to expectations (and counter to the practice of the broadly pro-climate action media organisation *The Guardian*) that changing the language from 'global warming' to 'global heating' may, at least in the short term, have the opposite effect of what is intended.

[17] https://www.smh.com.au/politics/federal/raving-inner-city-lunatics-michael-mccormack-dismisses-link-between-climate-change-and-bushfires-20191111-p539ap.html

Figure 7 Views on the environment by capital/non-capital city



Source: January 2020 ANUpoll.

6 Analysis of individual-level change in wellbeing and attitudes

The previous sections have documented a number of changes in attitudes and beliefs from when similar questions were asked in previous surveys, as well as differences in these attitudes and beliefs depending on a person's reported exposure to bushfires in the 2019/20 Australian spring and summer. It is difficult to attribute all or any of this change or variation to the bushfires, as many other things also occurred between surveys that are likely to have impacted on attitudes. Furthermore, exposure is not a completely exogenous event, and some of the things that predict exposure (particularly the more subjective, indirect measures) may also predict attitudes and beliefs.

It is not possible to control for some of these pre-exposure measures when looking at longer term change (i.e. those questions that were last asked in 2008) as the individuals who completed those surveys are highly unlikely to be the same individuals who completed the January 2020 survey, due to repeated sampling. However, as the more recent surveys were undertaken on the Life in Australia panel, it is possible to link individual responses for the subset of the sample that completed multiple waves. With this linked sample, explained in more detail at the end of this paper, we first look at the longitudinal determinants of bushfire exposure (Section 6.1). This is followed by analysis of change in wellbeing measures and views on the direction of the country (6.2), then political views (6.3) with the final sub-section (6.4) looking at changes in attitudes towards environmental issues.

6.1 Longitudinal predictors of exposure

Earlier in this paper, we looked at the factors that predict whether or not a person reported that they were exposed in different ways to the 2019/20 spring and summer Bushfires. We showed that there were very few demographic, socioeconomic and geographic measures that predicted direct exposure. The only exception was living outside of a capital city. There were, however, a larger subset of variables that were highly predictive of indirect or secondary exposure, including sex, age, education, and the socioeconomic characteristics of the area in which a person lives. It is improbable that these measures were affected by bushfire exposure. There may, however, be other variables that were associated with these measures that may predict exposure.

One way to get closer to a causal relationship is by controlling for a broader range of predictor variables, as observed prior to exposure. While this won't prove causality, it will give some indication as to the temporal nature of the association. We analysed the relationship between three variables as observed in October 2019 and reported bushfire exposure in January 2020 – life satisfaction, confidence in government, and satisfaction with the direction of the country. This association was analysed using a lagged independent variable model, where we also controlled for the demographic, socioeconomic, and demographic measures presented in Table 3, but observed in October 2019.

Table 5 shows that there were no substantial changes in the predictors of severe or indirect exposure once Wave 31 (October 2019) characteristics were controlled for. There was however a weak association with one of the subjective measures, with those who were satisfied with the direction of the country slightly less likely to report direct exposure (p-value = 0.061). There was no association with the other two measures though, once again highlighting that direct bushfire exposure was a largely exogenous event, or truly random with respect to individual's demographic and social backgrounds.

There was, however, a far stronger association between the subjective measures observed in October 2019 and the indirect/secondary bushfire exposure measure observed in January 2020. Specifically, those individuals who had higher life satisfaction and were more confident in the Federal Government were less likely to report secondary/indirect exposure (p-value of 0.024 and 0.015 respectively), with weak evidence that those who were more satisfied with the direction of the country were also less likely to report direct exposure (p-value = 0.128).

Table 5 Factors associated with bushfire exposure – Severe/direct exposure and indirect/secondary exposure

Variable	Severe/direct		Indirect/secondary	
	Marginal effect	Signific.	Marginal effect	Signific.
Life satisfaction (from 7 to 8)	0.003		-0.025	**
Confident in Australian Government	-0.014		-0.092	**
Satisfied with the direction of the country	-0.042	*	-0.058	
Female	-0.016		0.078	***
Aged 18 to 24	0.011		0.157	**
Aged 25 to 34	0.010		0.094	*
Aged 45 to 54	-0.019		0.021	
Aged 55 to 64	-0.023		0.062	
Aged 65 to 74	-0.033		0.090	*
Aged 75 plus	-0.003		0.053	
Indigenous	0.022		0.052	
Born overseas in a main English-speaking country	-0.035		-0.033	
Born overseas in a non-English speaking country	-0.030		0.013	
Speaks a language other than English at home	-0.024		0.015	
Has not completed Year 12 or post-school qualification	0.016		0.012	
Has a post graduate degree	0.053		0.066	
Has an undergraduate degree	-0.004		0.065	
Has a Certificate III/IV, Diploma or Associate Degree	0.039		0.054	
Lives in the most disadvantaged areas (1st quintile)	0.056		-0.158	***
Lives in next most disadvantaged areas (2nd quintile)	0.032		0.009	
Lives in next most advantaged areas (4th quintile)	0.065	*	0.028	
Lives in the most advantaged areas (5th quintile)	0.053		0.037	
Lives in a non-capital city	0.069	**	-0.030	
Probability of base case	0.140		0.714	
Sample size	1,571		1,571	

Source: January 2020 and October 2019 ANUpolls.

Notes: The base case individual had a life satisfaction of 7, did not have confidence in the Federal Government in Canberra, was not satisfied with the direction of the country, is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

6.2 Relationship between bushfire exposure and changes in satisfaction and confidence

One of the other benefits of having access to longitudinal data is that we can look at how bushfire exposure predicts changes in satisfaction (with one's own life and the direction of the country) or confidence in institutions, whilst holding constant pre-existing views. That is, rather than using these variables as observed in October 2019 to predict bushfire exposure, we use bushfire exposure to predict change in the subjective measures. This is still not quite a causal relationship, as there may be other characteristics that changed at the same time as bushfire exposure that are driving the change in satisfaction or confidence. Nonetheless, it does allow us to abstract from (or hold constant) the relationship between pre-existing attitudes and exposure documented in Table 5.

To analyse the relationship with change through time, we estimate a number of different models (five in total), depending on the nature of the main variable of interest. Specifically:

- Model 1 – We look at the relationship between bushfire exposure and life satisfaction in January 2020, holding constant life satisfaction at baseline, as well as demographic, socioeconomic, and geographic variables.
- Models 2 and 3 – We look at the relationship between bushfire exposure and the probability of being satisfied with the direction of the country separately for those who were not satisfied with the direction in October 2019 (Model 2) and those who were satisfied with the direction (Model 3), holding constant demographic, socioeconomic, and geographic variables.
- Models 4 and 5 – We look at the relationship between bushfire exposure and the probability of being confident in the Federal Government separately for those who were not confident in October 2019 (Model 4) and those who were confident (Model 5), holding constant demographic, socioeconomic, and geographic variables.

Beginning with life satisfaction, there was no statistically significant difference in the change in life satisfaction between October and January between those who reported either direct or indirect exposure to bushfires and those who did not. There was a very large proportion of respondents (60.5 per cent) whose life satisfaction was different in January 2020 compared to October 2019. This change, however, did not appear to be influenced by exposure to bushfires.

These results do not mean that changes in life satisfaction were not influenced by the bushfires, as the repeated cross-sectional analysis did show a significant decline over the period. Rather, the results imply that the bushfires either do not appear to have had a greater effect on this change in satisfaction for those who had direct or indirect exposure (as opposed to simply living in Australia during a time of national emergency) or there were other factors that were driving that change separate to the bushfires. Unfortunately, it is not possible to separately identify the potential effects with the data available (or any other conceivable dataset).

There was, however, a strong association between exposure to the bushfires and change in confidence in government, and a weaker association with change in satisfaction with the direction of the country (Table 6 and Table 7). Specifically, when we separate the longitudinal respondents into those who were and were not satisfied with the direction of the country in October 2019, there was an association between indirect bushfire exposure between the two periods and satisfaction in January 2020. This difference was relatively weak for those who

were not satisfied in October (p-value = 0.128), but stronger for those who were satisfied (p-value = 0.045). There was a weak relationship with the measure of direct exposure for those who were satisfied in October 2019, with those reporting direct exposure being more likely to report satisfaction again in January 2020 (p-value = 0.091).

While these results hold using a modelling approach, the unconditional differences highlight the size of the association. Specifically, with regards to those satisfied in 2019, only 78.3 per cent of those who were indirectly exposed to bushfires reported satisfaction in 2020 compared to 84.9 per cent of those who were not exposed. The raw difference was greater for those who were not satisfied in 2019 – 19.0 per cent satisfaction for those indirectly exposed to bushfires compared to 30.8 per cent for those not exposed.

Table 6 Factors associated with satisfaction with the direction of the country in January 2020 – By satisfaction in October 2019

Variable	Not satisfied in October 2019		Satisfied in October 2019	
	Marginal effect	Signific.	Marginal effect	Signific.
Direct/severe exposure	0.000		0.073	*
Indirect/secondary exposure	-0.071		-0.088	**
Female	0.000		-0.018	
Aged 18 to 24	-0.032		-0.120	
Aged 25 to 34	0.103		0.068	
Aged 45 to 54	0.072		0.014	
Aged 55 to 64	0.111		0.047	
Aged 65 to 74	0.154	*	0.052	
Aged 75 plus	0.225	**	0.029	
Indigenous	0.009		-0.236	*
Born overseas in a main English-speaking country	-0.110	**	-0.038	
Born overseas in a non-English speaking country	0.070		-0.156	**
Speaks a language other than English at home	-0.022		0.121	***
Has not completed Year 12 or post-school qualification	0.092	*	0.032	
Has a post graduate degree	-0.002		-0.053	
Has an undergraduate degree	-0.010		-0.048	
Has a Certificate III/IV, Diploma or Associate Degree	0.013		0.032	
Lives in the most disadvantaged areas (1st quintile)	-0.050		-0.018	
Lives in next most disadvantaged areas (2nd quintile)	-0.043		-0.004	
Lives in next most advantaged areas (4th quintile)	-0.036		0.040	
Lives in the most advantaged areas (5th quintile)	-0.036		0.063	
Lives in a non-capital city	-0.044		-0.010	
Probability of base case	0.214		0.809	
Sample size	672		902	

Source: January 2020 and October 2019 ANUpolls.

Notes: The base case individual did not report any bushfire exposure, is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

Moving on to changes in confidence, looking at those respondents who did have confidence in the Federal Government in October, indirect exposure to bushfires was associated with a significantly and substantially lower probability of being confident in January 2020. The same

was true for those who did not have confidence in the Federal Government in October. There was not, however, any association with direct exposure to bushfires and confidence in the government.

Once again, the scale of the difference is highlighted by the unconditional differences (that is, percentage differences without controlling for observed characteristics). Looking at those who were confident in 2019, only 57.4 per cent of those who reported indirect exposure to the bushfires reported confidence in the Federal Government in 2020 compared to 68.7 per cent of those who were not exposed. There was an even larger difference again for those who started out not confident in 2019 – 6.1 per cent confidence in January 2020 for those exposed compared to 19.2 per cent confidence for those not exposed.

Table 7 Factors associated with Confidence in the Federal Government in January 2020 – By confidence in October 2019

Variable	Not confident in October 2019		Confident in October 2019	
	Marginal effect	Signific.	Marginal effect	Signific.
Direct/severe exposure	0.021		-0.019	
Indirect/secondary exposure	-0.060	***	-0.104	*
Female	-0.032	*	-0.032	
Aged 18 to 24	0.002		-0.304	*
Aged 25 to 34	0.057		-0.260	**
Aged 45 to 54	0.035		0.051	
Aged 55 to 64	0.038		-0.036	
Aged 65 to 74	0.085		0.116	
Aged 75 plus	0.073		0.073	
Indigenous	0.030		-0.228	
Born overseas in a main English-speaking country	0.004		-0.029	
Born overseas in a non-English speaking country	0.015		0.041	
Speaks a language other than English at home	0.100	**	0.014	
Has not completed Year 12 or post-school qualification	0.021		-0.008	
Has a post graduate degree	-0.065	***	0.078	
Has an undergraduate degree	0.006		-0.062	
Has a Certificate III/IV, Diploma or Associate Degree	0.030		0.010	
Lives in the most disadvantaged areas (1st quintile)	0.051		-0.175	*
Lives in next most disadvantaged areas (2nd quintile)	-0.032		-0.162	*
Lives in next most advantaged areas (4th quintile)	-0.005		-0.011	
Lives in the most advantaged areas (5th quintile)	0.053		-0.025	
Lives in a non-capital city	0.031		0.045	
Probability of base case	0.080		0.763	
Sample size	1,031		539	

Source: January 2020 and October 2019 ANUpolls.

Notes: The base case individual did not report any bushfire exposure, is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

6.3 Changes in voting intentions/political satisfaction and bushfire exposure

Earlier in the paper, we showed that there was a large decline in the per cent of people who said that they would have voted for the Coalition if an election was held in January 2020, relative to the per cent of people who said they would have voted for the Coalition if an election was held in October 2019. It is possible however, by linking individuals through time, to look at the factors that predict that voter change. In total, 20.2 per cent of linked respondents said that they would vote for a different party in January 2020 compared to October 2019, a similar level of intra-election voter volatility observed over similar periods using the Life in Australia panel in the past.

Given the declines in the Coalition vote presented in Figure 5, it is worth focusing on changes in those who said they would vote for the Coalition in October 2019. In total, 17.7 per cent of the linked sample who said they would have voted for the Coalition in October 2019 said that they would have voted for a different party in January 2020. This is somewhat higher than the rate of voter change for those who said they would have voted Labor (15.9 per cent), but lower than the rate of change for those who said they would have voted Greens (26.5 per cent), an 'Other' party (24.6 per cent) or who didn't know who they were going to vote for (47.8 per cent).

Less than half of the outflow from the Coalition went to the Labor Party though. Specifically, of those who did change from saying they were going to vote for the Coalition, 43.9 per cent said they would vote Labor in January 2020, 14.3 per cent said they would vote for the Greens, 24.7 per cent said they would vote for an 'Other' party, and 17.1 per cent did not know who they would vote for.

In Table 8, we look at the factors associated with changing vote from the Coalition. That is, we look at the probability of voting for one of the four other parties or party groupings in January 2020, conditional on intending to vote for the Coalition in October 2019. As there were only 618 respondents in the linked sample who said they would have voted Coalition in October, the uncertainty around the estimates is quite large. There is some weak evidence that those who were directly exposed to the bushfires were more likely to change their vote from the Coalition. However, the p-value is quite large (0.633), meaning it is not possible to make definitive conclusions.

Looking at the other demographic variables, females were more likely to change their votes from the Coalition, relative to males. There were some other categories that also had a large positive marginal effect (being relatively young, Indigenous, and born overseas), but these differences were not statistically significant. Those at the upper end of the age distribution (particularly those aged 75 years and over) were less likely to have changed their vote from the Coalition, as were those who had a degree. Perhaps the most interesting finding though is that those who live in a non-capital city were more likely to have changed their vote from the Coalition, with an estimated probability of 0.212 compared to the base case of 0.104 (all else being equal)

Table 8 Factors associated with changing vote from the Coalition

Variable	Marginal effect	Signific.
Direct/severe exposure	0.019	
Indirect/secondary exposure	-0.004	
Female	0.063	*
Aged 18 to 24	0.115	
Aged 25 to 34	0.074	
Aged 45 to 54	-0.067	**
Aged 55 to 64	-0.038	
Aged 65 to 74	-0.030	
Aged 75 plus	-0.099	***
Indigenous	0.092	
Born overseas in a main English-speaking country	0.068	
Born overseas in a non-English speaking country	0.077	
Speaks a language other than English at home	-0.048	
Has not completed Year 12 or post-school qualification	-0.004	
Has a post graduate degree	-0.020	
Has an undergraduate degree	-0.057	*
Has a Certificate III/IV, Diploma or Associate Degree	-0.013	
Lives in the most disadvantaged areas (1st quintile)	-0.018	
Lives in next most disadvantaged areas (2nd quintile)	0.082	
Lives in next most advantaged areas (4th quintile)	0.102	*
Lives in the most advantaged areas (5th quintile)	0.128	**
Lives in a non-capital city	0.108	**
Probability of base case	0.104	
Sample size	618	

Source: January 2020 and October 2019 ANUpolls.

Notes: The base case individual did not report any bushfire exposure, is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

A very large part of the success of the Coalition government at the May 2019 election was attributed to Prime Minister Scott Morrison (Biddle 2019).[18] It is not surprising then, that the shift in voting intention from the Coalition coincided with a decline in the support for the Prime

[18] https://theconversation.com/coalition-wins-election-but-abbott-loses-warringah-plus-how-the-polls-got-it-so-wrong-116804

Minister. Using the linked sample from June 2019 to January 2020, the average decline in support for the Prime Minister was -1.19, on a scale from 0 to 10. Without controlling for other characteristics, this decline was not significantly different for those who voted for the Coalition in the May 2019 election (-1.31),[19] compared to the rest of the sample (including those who voted Labor, -1.20).

A slightly different picture emerges though when we take into account where voters started from in June 2019. Specifically, in Table 9 we look at the factors associated with likeability of Prime Minister Morrison in January 2020, controlling for observed characteristics as of June 2019. As the likeability scale is bounded by 0 and 10, those who had a relatively high likeability rating for the Prime Minister in June 2019 have a greater capacity for a large negative drop between then and January 2020. On the flipside, those who had lower likeability had a greater capacity for a large positive increase in likeability. For this reason, we hold constant likeability in June 2019 in our model. In the model we focus on the relationship between both bushfire exposure and May 2019 voting patterns and likeability, as well as the association with the main demographic, socioeconomic and geographic variables. By holding constant likeability in June 2019, we are essentially estimating what predicts change in likeability over the period.

As expected, the higher a person's likeability rating of the Prime Minister in June 2019, the greater the likeability score in January 2020. While this is not surprising, it is important to keep in mind that this relationship is held constant in the analysis.

Indirect exposure to the bushfires was associated with significantly lower likeability in January 2020 compared to June 2019. That is, if someone reported indirect exposure (friend/family damage; friend/family threatened; travel/holiday; smoke; anxious or worried) then the extent to which they reported Prime Minister Scott Morrison as likeable declined between June 2019 and January 2020, holding other characteristics constant.

While there was not any statistically significant association between direct bushfire exposure and change in likeability, the coefficient was positive and had a p-value of 0.144. That is, there is weak evidence that, if anything, those who had direct exposure to the bushfires increased their likeability rating for Prime Minister Scott Morrison, holding constant their rating in June 2019 and other demographic, socioeconomic and geographic characteristics.

Other factors that were associated with a change in likeability were age (younger people had a greater decline), country of birth (those born overseas had a greater decline), and language spoken at home (non-English speakers had a greater increase).

[19] The June 2019 survey did not ask respondents who they would have voted for if an election was held that day. Rather, respondents were asked who they voted for in the election in the previous month.

Table 9 Factors associated with likeability of Prime Minister Scott Morrison

Variable	Coefficient	Signific.
Likeability in June 2019	0.706	***
Direct/severe exposure	0.241	
Indirect/secondary exposure	-0.541	***
Female	-0.044	
Aged 18 to 24	-0.455	
Aged 25 to 34	-0.643	**
Aged 45 to 54	0.306	
Aged 55 to 64	0.268	
Aged 65 to 74	0.595	**
Aged 75 plus	0.842	***
Indigenous	-0.428	
Born overseas in a main English-speaking country	-0.226	
Born overseas in a non-English speaking country	-0.433	**
Speaks a language other than English at home	0.575	**
Has not completed Year 12 or post-school qualification	-0.029	
Has a post graduate degree	-0.076	
Has an undergraduate degree	-0.070	
Has a Certificate III/IV, Diploma or Associate Degree	0.029	
Lives in the most disadvantaged areas (1st quintile)	-0.012	
Lives in next most disadvantaged areas (2nd quintile)	0.158	
Lives in next most advantaged areas (4th quintile)	0.308	
Lives in the most advantaged areas (5th quintile)	0.106	
Lives in a non-capital city	-0.058	
Constant	0.569	
Sample size	1,659	
R-Squared	0.5988	

Source: January 2020 ANUpoll and June 2019 Comparative Study of Electoral Systems.

Notes: The base case individual did not report any bushfire exposure, is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

6.4 Changes in environmental attitudes and bushfire exposure.

A consistent finding with regards to research on views towards climate change is that attitudes are shaped as much or even more by political preference, as voting patterns are shaped by views on climate change. This was summarised well by Matthew Yglesias writing for *Vox* (albeit

in the US)[20], who concluded that 'For practical purposes, most of what you need to know about people's beliefs on climate change you can glean from their partisan affiliation.'

While this is a reasonably depressing view of how people make judgements on such a serious issue as climate change, the repeated cross-sectional data presented earlier in this paper shows that views can change over the short or long term. Furthermore, there is a small but growing body of literature that suggests that exposure to extreme natural events (like that documented in this paper) can shift views, albeit mostly in the short term (Konisky, Hughes et al. 2016, Ray, Hughes et al. 2017).

In a review article, Howe, Marlon et al. (2019) concluded that they 'find mixed evidence that weather shapes climate opinions. Although there is some support for a weak effect of local temperature and extreme weather events on climate opinion, the heterogeneity of independent variables, dependent variables, study populations, and research designs complicate systematic comparison.' While a detailed analysis of the effects of extreme weather (in this case bushfires) is beyond the scope of this initial summary paper, we are able to make an initial contribution to the literature by filling two of the gaps identified in , Howe, Marlon et al. (2019) – analysing a population outside the US, and making use of longitudinal data.

The two environmental measures that we have longitudinal data for are whether the environment is seen as the most or second most important issue, and views on coal mines. Beginning with issue salience, Table 10 looks at the probability of reporting that the environment was the most important or second most important issue facing Australia in January 2020, analysed separately by views in October 2019.[21] There was no association between direct exposure and change in views. There was, however, a significant association with indirect exposure with those who reported indirect exposure being more likely to report that they thought the environment was the most or second most important issue, holding constant their views in October 2019. Females, and the relatively young (particularly under 35) were more likely to change from the environment not being seen to be a major issue to seeing it as a major issue.

[20] https://www.vox.com/science-and-health/2017/3/23/15032488/climate-beliefs-2016-election-votes

[21] The main results hold when we combine those who think that the fires, natural events or extreme weather were the main issues in addition to those who thought the environment were the main issues.

Table 10 Factors associated with whether environment seen as important issue in January 2020 – By views in October 2019

Variable	Not major issue in October 2019		Major issue in October 2019	
	Marginal effect	Signific.	Marginal effect	Signific.
Direct/severe exposure	0.025		-0.060	
Indirect/secondary exposure	0.087	***	0.123	***
Female	0.074	***	0.033	
Aged 18 to 24	0.143	*	0.006	
Aged 25 to 34	0.160	**	0.022	
Aged 45 to 54	0.096	**	-0.073	
Aged 55 to 64	0.071		-0.052	
Aged 65 to 74	0.087	*	-0.107	
Aged 75 plus	0.021		-0.208	**
Indigenous	-0.062		-0.059	
Born overseas in a main English-speaking country	-0.001		0.010	
Born overseas in a non-English speaking country	-0.023		-0.043	
Speaks a language other than English at home	0.008		-0.044	
Has not completed Year 12 or post-school qualification	-0.023		-0.049	
Has a post graduate degree	0.031		0.159	***
Has an undergraduate degree	0.016		0.032	
Has a Certificate III/IV, Diploma or Associate Degree	0.005		0.006	
Lives in the most disadvantaged areas (1st quintile)	-0.041		-0.062	
Lives in next most disadvantaged areas (2nd quintile)	-0.005		-0.087	
Lives in next most advantaged areas (4th quintile)	-0.003		-0.045	
Lives in the most advantaged areas (5th quintile)	0.004		0.042	
Lives in a non-capital city	-0.031		0.025	
Probability of base case	0.099		0.734	
Sample size	801		711	

Source: January 2020 and October 2019 ANUpolls.

Notes: The base case individual did not report any bushfire exposure, is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

While there has been an overall decline in support for new coal mines, the relationship with exposure to the bushfires is somewhat complicated. For those who didn't support new coal mines when asked in June 2019, indirect exposure was associated with a small further decline

in the probability of supporting new coal mines when asked in January 2020 (marginal effect of -0.052 and a p-value of 0.058). When focusing on those who did support new coal mines in June 2019, on the other hand, those who had direct exposure to the bushfires were more likely to support new coal mines than those who didn't have direct exposure. The marginal effect of this difference was reasonably large (0.108) and the p-value was reasonably small (0.034).

There were also large declines in support for females, and the relatively young (aged 18 to 24 years).

Table 11 Factors associated with support for new coal mines in January 2020 – By views in June 2019

Variable	Not supportive of coal mines in June 2019		Supportive of coal mines in June 2019	
	Marginal effect	Signific.	Marginal effect	Signific.
Direct/severe exposure	0.011		0.108	**
Indirect/secondary exposure	-0.052	*	-0.053	
Female	0.049		-0.101	**
Aged 18 to 24	-0.042		-0.464	**
Aged 25 to 34	-0.017		-0.016	
Aged 45 to 54	-0.032		0.039	
Aged 55 to 64	-0.003		0.052	
Aged 65 to 74	-0.036		0.068	
Aged 75 plus	-0.068		0.102	
Indigenous	0.000		0.086	
Born overseas in a main English-speaking country	-0.039		-0.091	
Born overseas in a non-English speaking country	0.164	***	-0.213	**
Speaks a language other than English at home	0.014		0.111	
Has not completed Year 12 or post-school qualification	0.069	*	-0.070	
Has a post graduate degree	-0.049		0.063	
Has an undergraduate degree	-0.032		-0.103	
Has a Certificate III/IV, Diploma or Associate Degree	0.003		0.014	
Lives in the most disadvantaged areas (1st quintile)	0.045		0.075	
Lives in next most disadvantaged areas (2nd quintile)	0.084		0.089	
Lives in next most advantaged areas (4th quintile)	0.089		0.017	
Lives in the most advantaged areas (5th quintile)	0.029		0.041	
Lives in a non-capital city	-0.026		-0.007	
Probability of base case	0.099		0.715	
Sample size	915		728	

Source: January 2020 ANUpoll and June 2019 Comparative Study of Electoral Systems.

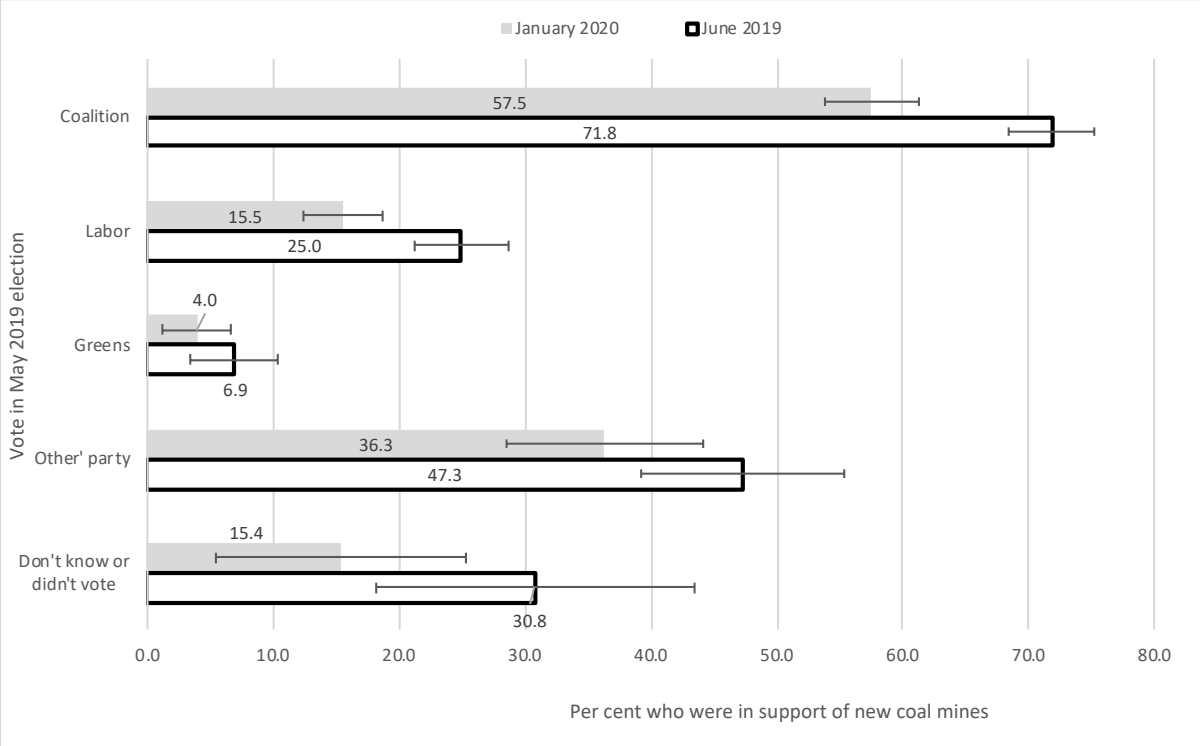
Notes: The base case individual did not report any bushfire exposure, is female; aged 35 to 44; non-Indigenous; born in Australia; does not speak a language other than English at home; has completed Year 12 but does not

have a post-graduate degree; lives in neither an advantaged or disadvantaged suburb (third quintile); and lives in a capital city

Those coefficients that are statistically significant at the 1 per cent level of significance are labelled ***; those significant at the 5 per cent level of significance are labelled **, and those significant at the 10 per cent level of significance are labelled *.

While the relationship between exposure and support for coal mines was complicated, one of the interesting findings from the linked data was that the decline was not restricted to those who supported one particular political party, even though baseline views in June 2018 did vary quite substantially. There were clearly very large differences in views on coal mines in June 2019 based on who a person voted for at the most recent election. What is most interesting in Figure 8 though is that, in absolute terms the greatest drop in support for new coal mines was amongst those who voted for the Coalition in May 2019 – from 71.8 per cent support in June 2019 to 57.5 per cent in January 2020.

Figure 8 Support for new coal mines in June 2019 and January 2020, by vote in May 2019 Federal Election



7 Concluding comments and implications of data and analysis

The data discussed and summarised in this paper gives Australia a unique window into the experience of the 2019/20 spring and summer bushfires. At the time of writing, fires were still burning, smoke was impacting on the cities that we live and work, and the institutions that we rely on for a functioning, modern society (political parties, the government, media, schools, universities, the public service) were all grappling with how to process and respond to what has been described by other august institutions like the Academy of Science as unprecedented in scale and impact.

As far as we are aware, there is no other dataset like that analysed in this paper. Unlike public opinion polls during and after the fires, data from the Life in Australia is from a probability

panel that can be weighted to be representative of the Australian population and that can have robust standard errors calculated in order to measure uncertainty. It is also relatively large. Unlike cross-sectional surveys that must surely be in the planning stage, we have data on the same individuals prior to the fires, with consistently asked questions and control variables. Unlike other non-targeted longitudinal surveys, we have self-reported measures of exposure.

The results presented in this paper show varying degrees of exposure, with a small proportion of the population having their property damaged or destroyed, but a slightly larger percentage having their property threatened, or being evacuated. There was a very large proportion of the population – around three quarters – that reported some form of indirect exposure, with the most common form of exposure being physically affected by smoke or feeling anxious or worried. While some of our estimates are large, official statistics about the number of people who were residents and domestic overnight visitors seem make it likely there were over 3 million people in bushfire affected areas at the time.

Our analysis documents quite significant changes in attitudes regarding the bushfires. Australians have become satisfied with the direction of the country, less satisfied with their own life, and less confident in the Federal Government. They are much less likely to say that they would vote for the Coalition, and give far lower ratings for Prime Minister Scott Morrison. They are more likely to think that climate change or global warming is a serious issue, more likely to think that it is a threat to them, and less likely to support new coal mines.

These results are not because of changes in the composition of our sample, a statement that cannot be made with repeated cross-sectional data. Rather, we have shown that attitudes of a sample of individual Australians has changed in the directions outlined above, with many of these changes predicted by exposure to the bushfires.

The results presented in this paper have implications for a number of actors in Australian society.

For those responding to the bushfires through the delivery of services, it is clear that there are very large levels of exposure, and that indirect exposure can be as important for certain outcomes as direct exposure. There is also some evidence that particular population groups – males and those in non-capital cities – may be underreporting anxiety or worry, and therefore missing out on mental health services following the fires.

For the Coalition Government, the results suggest that changes in attitudes are not restricted to those who would not have voted for the Coalition in the first place. The change in voting intention is as substantial as other reporting would suggest. There is good news though, in that those who had more direct forms of exposure to the bushfire were no more likely to have changed their vote away from the Coalition than those who weren't exposed. They weren't less likely to have though.

There are also implications for the two main opposition parties. Swings away from the Coalition between October 2019 and January 2020 did not result in large swings towards Labor or the Greens. These two parties need to engage with those who currently don't know who they would vote for or who would vote for an 'Other' party if they want to capitalise on the ill feeling towards the Coalition and Prime Minister Scott Morrison. A disproportionate amount of the swing did occur outside of the capital cities, likely to be key battlegrounds between now and the next election.

For those who are supportive of action on climate change, there are more Australians who see global warming as an issue, more who see it as a threat to them, and more who think that there should be no new coal mines. Some of this change appears to have been increased by exposure to the bushfires. While these are now strongly majority views, they are still not views held by a plurality of Australians. Furthermore, while there has been some convergence (some of the largest changes have been among Coalition supporters), views still do correlate strongly with voting intention. Given the evidence that people continue to take their cue on environmental issues from those who they support politically, those who would like to see a greater shift in support for action on climate change can't rely on natural disasters, must continue to engage with issues of identity, and must continue to engage with all sides of politics.

Finally, the data summarised in this paper provides opportunities for future research and new insights. The data will be made available through the Australian Data Archive and there is far more analysis that could be done on the data. The verbatim responses on the major issue facing Australia could be analysed using more qualitative techniques. There are many more longitudinal (and cross-sectional) variables that could be analysed alongside bushfire exposure and changes in attitudes. And future waves of ANUpoll could test for changes in additional variables, and test the persistence of the changes presented in this paper.

Ultimately, if the 2019/20 Australian spring and summer bushfires were unprecedented in scale, then they require an unprecedented social research response.

8 About the survey

Interviews commenced on 20 January 2020, and continued for a two-week collection period. However, 58.5 per cent of the sample were collected in the first four days of data collection. A total of 4,009 active panel members were invited to take part in the survey, leading to a completion rate of 81.0 per cent for the survey

For those respondents who were in the panel prior to January 2020, ANUpoll for the month was linked to previous polls at the individual level. Between October-December 2019, the panel was refreshed with n = 347 panellists being retired and n = 1,810 new panellists being recruited. This recruitment used a G-NAF (Geocoded National Address File) sample frame and push-to-web methodology. Only online participants were recruited in order to balance the demographics (the age profile of panel members was older and more educated than that of the Australian population). The recruitment rate (RECR) for the replenishment was 12.1%. This boosted sample means that longitudinal analysis is restricted to the original panel members or previous sample refreshes.

The Social Research Centre collected data online and through Computer Assisted Telephone Interviewing (CATI) in order to ensure representation from the offline Australian population. Around 6.5 per cent of interviews were collected via CATI.

The contact methodology adopted for online Life in Australia™ members is an initial survey invitation via email and SMS (where available), followed by multiple email reminders and a reminder SMS. Telephone non-response of panel members who have not yet competed the survey commences in the second week of fieldwork and consists of reminder calls encouraging completion of the online survey.

The contact methodology for offline Life in Australia™ members was an initial SMS (where available), followed by an extended call-cycle over a two-week period. A reminder SMS was also sent in the second week of field.

Taking into account recruitment to the panel, the cumulative response rate for this survey is 8.3%

Unless otherwise stated, data in the paper is weighted to population benchmarks. For Life in Australia™, the approach for deriving weights generally consists of the following steps:

1. Compute a base weight for each respondent as the product of two weights:
    a. Their enrolment weight, accounting for the initial chances of selection and subsequent post-stratification to key demographic benchmarks
    b. Their response propensity weight, estimated from enrolment information available for both respondents and non-respondents to the present wave.
2. Adjust the base weights so that they satisfy the latest population benchmarks for several demographic characteristics.

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