Children in Disasters: The Role of Household Preparedness

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Abstract

To increase children's resilience to disasters, it is important to expand our understanding of what increases their vulnerability. One household factor that has been tied to disaster resilience in general is the extent to which households have prepared themselves. In the context of wildfire preparedness, the current study examined whether households with very young, young, or teenage children differ in the extent to which they prepare their household compared to childless households. A two-wave survey study among Australian residents of wildfire prone areas ($N_{\text{wave1}} = 998$, $N_{\text{wave2}} = 514$) found that households with young (under twelve years old) and very young (under six years old) children had prepared their properties less for wildfires compared to childless households at the start of the wildfire season, but they had caught up in property preparedness by the end of it. However, households with younger children also performed fewer disaster planning actions than childless households. This difference remained significant throughout the season. The former group also reported lower motivation to prepare, greater perceived difficulty in preparing, and greater lack of time to prepare than childless households. The majority of these findings were explained by the younger age of the adult parents rather than the presence of younger children per se. An exception was that those with young and very young children reported a greater lack of time to prepare than childless adults of a similar age. We discuss practice and public policy implications that follow from this research.

1. INTRODUCTION

Children, especially zero to five year olds, are one of the most vulnerable demographics in natural disasters, both in terms of physical effects such as injuries and death (WHO/UNICEF 2008) and in terms of psychosocial effects (Norris et al. 2002). When including both impact-related fatalities and fatalities in the immediate aftermath, children represent 30-50% of fatalities in disasters worldwide (WHO/UNICEF 2008), and of the 15 leading causes of death for children ages 1-18 years old, several relate to hazard impacts (e.g., drowning; fire-related burns) or consequences in the aftermath (e.g., diarrhoeal-related problems; lower and upper respiratory conditions) (Alderman 2012; WHO/UNICEF 2008). Furthermore, children's lack of experience and resources puts them at heightened vulnerability to the mental health impact of disasters (Schonfeld 2004), often resulting in long lasting consequences such as academic failure, depression, and anxiety disorders (LaGreca et al. 2002; Masten and Osofsky 2010; Pane et al. 2005). Combining their vulnerability with the rising incidence, intensity, and scale of natural disasters (Centre for Research on Epidemiology of Disasters 2015; Intergovernmental Panel on Climate Change 2014; Leaning and Guha-Sapir 2013) means it is increasingly important to identify factors that may play a role in children's vulnerability in disaster contexts.

Research has shown that children's vulnerability is not only tied to their own abilities and physiologies, many of which will be hard to influence: It is also tied to the abilities and actions of their parents. For one, young children are highly reliant on adults. For example, research has shown that if children are separated from parents during a disaster, their risk of negative outcomes increases significantly (Chung and Blake 2014; Nager 2009). In addition, children's vulnerability has been tied to parent coping during and after a disaster. More specifically, on the one hand heightened

parent anxiety, depression, and hostility have been related to increased risk of mental distress in children following a disaster (Norris et al. 2002; Pfefferbaum et al. 2015; Terranova et al. 2015). On the other hand, parent support has been shown to function as a protective factor for children's mental health (Lai et al. 2015). Furthermore, even though households worldwide typically do not prepare well for disasters (Falkiner 2016; Kohn et al. 2012), when parents do prepare, benefits already start accruing for children before a disaster has occurred. For example, research demonstrates that "risk reduction and resilience" public education (e.g., Nathe, 2000; Wood et al., 2012) and educational programs done specifically for children and youth, typically in school settings (Ronan et al., 2016), have been shown to lead to increased household motivation and preparedness. Furthermore, hazards educational research for children and youth has shown such programs to lead to reduced hazard fears reported by children, increased knowledge of safety and other prevention and mitigation strategies and enhanced confidence/efficacy around response capacity for the children (Ronan et al. 2010, 2012; Ronan and Johnston 2003; Webb and Ronan 2014). Given the important role parents play in influencing children's vulnerability to disasters, research on children's vulnerability necessarily requires examination of the household context (Webb and Ronan 2014), including through evaluations done over time, whether as part of prospective or intervention-/educational-related time series designs.

1.1. Hazard Preparedness In Households With Children

One factor that has been generally linked to resilience in relation to disasters is the extent to which households have prepared themselves for both the immediate and long-term impact of said disasters. One might reasonably expect adults with children to be more motivated to prepare for disasters in order to keep their children safe.

Some research supports this assumption (Ronan and Johnston 2005). This includes findings that households with children prepare more for earthquakes, and are more likely to have emergency supplies and a family plan (Kohn et al. 2012). However, other research has found that having a child predicted a higher likelihood of having household emergency supplies in one sample of households (New Orleans) but not another (Los Angeles) (Basolo et al. 2009). In addition, some studies [evaluating the role of children in households](#) have [not found any](#) differences in preparedness (e.g., [in number of](#) emergency supplies, DRR skills, planning, protection measures) (Kirschenbaum 2006); having a family plan, or knowing how to shut off utilities (Basolo et al. 2009).

It is possible that these mixed results are partially due to variability in the ages of the children in these studies. More specifically, whilst it seems plausible that parents would generally be highly motivated to prepare in order to keep their children safe, it is plausible that households with younger children are busier and may have less time or inclination to prepare and plan than households with older children or no children at all. Having children in the household, especially younger ones, gives rise to a number of other pressing priorities linked to child-rearing (e.g. attending to daily routines, keeping children safe from more common everyday hazards) that might preempt the relative importance of preparing for potential disasters, resulting in a relatively lower motivation and less time available to prepare for them. This is in line with the evidence that an important obstacle to preparedness is having other priorities besides preparedness. Such other priorities have been shown to impact on motivation, time, and perceived effort availability (Becker et al. 2013).¹ In addition, having younger children might increase the perceived difficulty of preparing. A simple

¹ In that study, those who endorsed beliefs about preparedness also were more likely to endorse beliefs that revolved around the theme of preparedness as a “way of life.”

example here is that picking up children from day-care in cases of emergency may add complexity and time necessary to create a hazard response plan.

An alternative line of thinking is that, rather than being tied to the presence of (younger) children in the household, preparedness is tied to the age of the parents. Adults with younger children in the household are, on average, younger than adults with older children, or those without children since the latter includes households where the children have already moved out (Australian Bureau of Statistics 2010; Basolo et al. 2009). Research has shown that adult age is significantly and positively correlated to preparing one's property and planning for wildfires (McNeill et al. 2013), stockpiling basic supplies (Norris et al. 1999 and knowing how to shut off utilities in case of a hurricane (Basolo et al. 2009), amongst others.

Furthermore, perceived complexity, lack of time, and a reduced perception of the importance of preparing relative to other activities could also be tied to the age of the adults rather than solely to having children of a certain age in the household. For example, younger adults do not have as much experience in preparing, and therefore could perceive preparing as more difficult. In addition, it is possible that younger adults may, on average, have a larger number of other important goals to pursue such as establishing a career, saving and buying a property, and other developmental needs linked to their age cohort. If so, this may result in spending less time on preparing.

1.2. Aims and Hypotheses

Using a prospective design, the current study aimed to investigate whether households with children, especially younger ones, differ in their level of preparedness for disasters from those without children, and if so, whether this is tied to the presence of younger children in the household, tied to the younger age of the

parents, or both. In addition, the study aimed to examine the role of several motivational factors, namely motivation to prepare, perceived difficulty of preparing, and perceived lack of time to prepare. Based on the foregoing review, the following hypotheses were developed:

1. Younger residents prepare less than older residents.
- 2a. Younger residents are less motivated to prepare than older residents.
- 2b. Younger residents perceive preparing as more difficult than older residents.
- 2c. Younger residents report a greater lack of time to prepare than older residents.
3. Households with children, especially young and very young ones, prepare less than households without children.
- 4a. Households with children, especially young children, are less motivated to prepare than household without children.
- 4b. Households with children, especially young children, perceive preparing as more difficult than households without children.
- 4c. Households with children, especially young children, report a greater lack of time to prepare than households without children.
5. Households with younger children consist of younger adults than households with older children or households without children.

In addition to these hypotheses, we set out to test whether the hypothesized effects of having young children in the household on preparing, motivation, difficulty, and lack of time are due to the presence of the younger children or due to the fact that the adults in households with younger children are younger than the adults in households without children, or a combination of the two.

These hypotheses were tested in relation to preparing for one particular natural hazard, namely wildfires.

2. METHOD

2.1. Participants and Procedure

Participants from a sampling pool of an Australian online panel company were invited to participate in a two-wave longitudinal study conducted over the Australian summer of 2014 and 2015. To ensure all participants lived in areas that experience a risk of wildfire during the Australian summer, panel members first received a short screener survey. This allowed us to invite only those who lived on a property that was less than 100m away from the closest bushland, were at least 18 years old, and were at least moderately involved in wildfire safety-related decisions in their household. The items presented in this study formed part of a larger survey on wildfire preparedness by residents of wildfire prone areas. All variables presented here were captured during Wave 1 with the exception of property preparedness and planning, which were captured at Wave 1 and Wave 2.

2.1.1. Wave 1

Invitations for the first survey were sent out four weeks after the announcement of the wildfire danger period in participants' local areas. The start of this period in Australia varies per state and region. Since data were collected across several states (i.e., Victoria, New South Wales, Western Australia, South Australia, and Tasmania), we consulted fire agencies and emergency services websites to find out when local councils and governments were declaring the wildfire danger period (during which properties were most at risk of wildfire). By sending out the survey four weeks after the official start of the danger period in each state and council area,

we captured preparedness actions at a time where they should have already been completed.

Out of 3913 people who were invited to complete the screener survey, 153 respondents ($153/3913 = 3.9\%$) did not complete the screener survey, 17 respondents ($17/3913 = 2.5\%$) were too young to participate (under 18 years old), 34 respondents ($34/3913 = 0.8\%$) did not live in one of the targeted states, 1801 respondents ($1801/3913 = 46.0\%$) did not live within 100 meters of bushland, and 318 respondents ($318/3913 = 8.1\%$) were screened out as they stated another person in their household was responsible for making bushfire related decisions. The remaining 1494 respondents ($1494/3913 = 38.2\%$) who completed the screener successfully and met inclusionary criteria were invited to start the Wave 1 survey. This ultimately resulted in 1092 completed surveys (response rate of $1092/1494 = 73.1\%$). To enhance validity, we incorporated four attention checks in the survey, namely 1) a completion time of less than 15 minutes, which is less than half of the estimated time (our estimate was 30 minutes, and the median completion time of participants was 34 minutes), 2) a validation question where respondents were asked to tick the “not applicable” box to show they were paying attention, and 3) two consistency checks where we compared two items with reversed meanings. An example of the latter was a comparison of answers to the items “I never worry about anything” and “I worry all the time” (both scored on a 5-point Likert scale). Respondents received an inconsistency mark when they either ticked 1 or 2 for both items, or ticked 4 or 5 for both items. We removed 55 participants who had failed more than two out of four checks. Finally, we analysed IP addresses and only included the first participant from each household who successfully completed the survey to ensure participants all came from unique households. This resulted in the removal of a further 39 participants. In

sum, 94 out of 1092 participants who completed the Wave 1 survey were removed due to indicators of low validity ($94/1092 = 8.6\%$).

The final sample of Wave 1 consisted of 998 adult Australians living in wildfire prone areas across Australia (58.5% women, 41.2% men, 0.3% other), with a mean age of 52.7 years ($SD = 15.2$). On average, participants had spent 12.4 years ($SD = 9.3$) in their current property, and 15.0 years ($SD = 10.3$) in their town or suburb. Almost all participants (97.1%) reported that they lived in their properties full-time, and the majority of the properties were described as houses on a residential block (67.3%). Other property types included apartments or units on a residential block (13.6%), houses on a small acreage/hobby farm block (12.0%), and houses on a large farm (3.2%; 3.8% selected “Other”). Finally, 234 households (23.4%) reported having at least one child under the age of 18 in the household.

2.1.2. Wave 2

Participants who indicated they were prepared to receive a follow up questionnaire ($n=858/998 = 86.0\%$) received the Wave 2 survey approximately six weeks after receiving the Wave 1 survey. This resulted in 574 completed and successfully matched surveys, equalling a response rate of 66.9%. We included two attention checks in Wave 2, namely 1) a completion time of less than ten minutes, which is less than half of the estimated time (our estimate was 20 minutes, and the median completion time of participants was 29 minutes), and 2) a validation question where respondents were asked to tick the “not applicable” box to show they were paying attention. We screened out participants who failed both checks, resulting in the deletion of 60 out of the 574 (10.4%) cases due to indicators of poor attention.

The final Wave 2 sample of 514 cases (57.4% females, 42.4% males, 0.2% other) had a mean age of 53.6 years ($SD = 14.6$). On average, participants had spent 12.7 years ($SD = 9.2$) in their current property, and 15.4 years ($SD = 10.2$) in their town or suburb. Almost all participants (96.9%) reported that they lived in their properties full-time, and the majority of the properties were described as houses on a residential block (66.1%). Other property types included apartments or units on a residential block (13.0%), houses on a small acreage/hobby farm block (13.8%), and houses on a large farm (2.9%; 4.1% selected “Other”). Household composition was similar to Wave 1 with 21.2% ($n = 114$) of households having at least one underage child living at home.

2.2. Measures

2.2.1. Age of Youngest Child

Participants were asked to indicate how many children under the age of 18 were living in their household, and, for those who answered one or more, what the age of their children was at the time of answering the survey. We also recorded participants' household composition, and coded those with children as either single parent or double parent households. To test our hypothesis that households with very young children will end up less prepared than those with older children or those without children, we coded each participant according to the age of their youngest child. More specifically, we grouped participants into the following categories: 1) youngest child was aged five years or under, 2) youngest child was between six and 11 years old, 3) youngest child was between 12 and 17 years old, and 4) no children under the age of 18 years old lived in the household.

2.2.2. *Property Preparedness*

We measured two different types of preparedness for wildfires, namely the extent to which residents had prepared their property for a wildfire threat to make it more fire resistant and the extent to which residents had planned their actions in case of a wildfire threat. To measure the extent to which participants had prepared their property to make it more fire resistant, participants were presented with a set of 22 items, developed by Dunlop et al. (2014) that captured conditions that require action on the part of the householder. If fulfilled, these key actions are expected to improve a householder's chances of ensuring their homes survive during a wildfire threat (i.e. actions that maximize the fire resistance of the home). Examples include "There is a minimum 2m (two yard) gap between the house and tree branches" and "Gaps around window frames are sealed".

In the Wave 1 survey, participants were asked to report on how likely it would be that each action would be completed within a month of completing the survey. They were given a two-section response scale. The first section captured intentions to complete the action in the near future, ranging from 1 (*Definitely will not do it*) to 5 (*Definitely will do it*). The second section provided respondents with an option to indicate that they had already completed the action (coded 6 in the data file), and an option to indicate that the action was not applicable to their household situation (coded as missing). The *property preparedness score* was calculated as the percentage of actions completed at the time of filling out the survey as a proportion of all the actions that were applicable to the respondent's household. Scores thus ranged between 0 and 1.

At Wave 2, participants were presented with the same preparatory actions and asked to indicate whether or not they had completed each action at the time of filling

out the survey. The score was again calculated as the percentage of relevant actions completed at the time of filling out the survey, and thus again ranged between 0 and 1.²

2.2.3. *Planning*

To measure the extent to which participants had planned their response in case of a wildfire threat, participants were presented with a set of eight items, adopted from McNeill et al. (2016), that captured a variety of decisions and considerations that, if fulfilled, would increase the chances of a householder responding safely and competently to a wildfire threat. Participants were asked to report on how likely it would be that each planning action (e.g. “You have thought carefully about what each person in your household would need to do in the event of a bushfire”) would be completed within a month of completing the survey. Like property preparedness, planning was measured at both Wave 1 and Wave 2, and the response formats were equivalent to the ones used for property preparedness at Wave 1 and Wave 2, resulting in a *planning score* between 0 and 1.²

2.2.4. *Motivation to Prepare*

To capture the extent to which participants were motivated to prepare for wildfires, we asked them to rate the extent to which they agreed with six different statements on a 9-point Likert scale (1 = very strongly disagree, 9 = very strongly agree; alpha = 0.92). Examples of statements include “I find it important to carry out

² Due to the formative nature of the Property Preparedness and Planning items (e.g., completion of each item builds towards greater preparedness, and the items are not expected to be correlated; see Bagozzi, 2011, for a discussion of formative versus reflective measures), Cronbach’s alphas were not calculated for the Property Preparedness and Planning measures.

my responsibilities to prepare”, and “When it comes to making a plan for bushfires, I am not really that interested in doing so” (reverse scored).

2.2.5. Perceived Ability to Prepare

We captured two additional reasons why people may fail to prepare, namely due to a perceived difficulty of preparing, and due to a lack of time to prepare. To capture participants’ perceived difficulty of preparing, they rated their agreement with the statements “When it comes to preparing for bushfires, I would like to prepare more, but find some of the tasks involved too difficult to complete” and “When it comes to making a plan for bushfires, I would like to have a better bushfire plan, but find some of the things involved too difficult to do” on a 9-point Likert scale (1 = very strongly disagree, 9 = very strongly agree; $\alpha = 0.79$). To capture participants’ lack of time to prepare, they rated their agreement with the statements “When it comes to preparing for bushfires, I would like to prepare more, but find it hard to make time to do so” and “When it comes to making a plan for bushfires, I would like to have a better bushfire plan, but find it hard to make time to do so” on a 9-point Likert scale (1 = very strongly disagree, 9 = very strongly agree; $\alpha = 0.86$).

3. ANALYSES AND RESULTS

3.1. Testing H1, H2a, H2b, and H2c

Descriptive statistics and zero-order correlations of the following variables are listed in Table I: Gender and Age, Motivation to Prepare, Perceived Difficulty of Preparing, Lack of Time to Prepare, Property Preparedness at Wave 1 and Wave 2, and Planning at Wave 1 and Wave 2. In line with hypotheses 1, 2a, 2b, and 2c, age of the participant was positively related to the extent to which they had prepared their

property, the extent to which they had planned their response to a wildfire threat (Hypothesis 1), and the extent to which they were motivated to prepare (2a), and negatively related to the extent to which they reported preparing to be difficult (2b), and reported to experience a lack of time to prepare (2c).

INSERT TABLE I AROUND HERE

3.2. Testing H3

3.2.1. Preliminary Analyses

Before testing hypotheses regarding the age-category of the youngest child (H3-4), we first wanted to examine whether two additional child-related factors needed to be controlled for, namely the total number of children in the household, and household composition (i.e. single vs. two parent households). We therefore conducted a set of preliminary analyses amongst participants with at least one child. A correlational analysis between number of children in the household and the extent to which participants had prepared their property and the extent to which they had planned their response to a wildfire threat showed no significant results ($r_{property} = 0.09$ and $r_{planning} = 0.02$ at Wave 1, and $r_{property} = 0.04$ and $r_{planning} = 0.01$ at Wave 2 respectively, $p > 0.16$ for all). Similarly, comparing households with a single parent to households with two parents also failed to show significant differences in the extent to which participants had prepared their property ($t(229) = 0.41$, $p = 0.68$ at Wave 1; $t(109) = -0.03$, $p = 0.98$ at Wave 2) and planned their response ($t(229) = 0.28$, $p = 0.78$ at Wave 1; $t(107) = 0.56$, $p = 0.58$ at Wave 2). We therefore did not take these variables into account in the analyses reported below.

3.2.2. Testing Hypothesis 3

To test whether households with children, especially young and very young ones were less prepared than households without children, we ran four univariate Analyses of Variance (ANOVAs) with the age category of the youngest child in the household (including a “no children under 18 years old” category) as the predictor and the extent to which participants had prepared their property and planned their response to a wildfire threat at Wave 1 and Wave 2 as the dependent variables respectively. Means and standard deviations of the dependent variables across the four cells of our predictor variable are reported in Table II.

The age category of the youngest child in the household was a significant predictor of the extent to which participants had prepared their property at Wave 1 ($F(3, 980) = 9.60; p < 0.001$; Partial Eta Squared = 0.029), the extent to which they had planned their response to a wildfire threat at Wave 1 ($F(3, 972) = 4.37; p < 0.01$; Partial Eta Squared = 0.013), and a marginal predictor of the extent to which they had planned their response to a wildfire threat at Wave 2 ($F(3, 491) = 2.57; p = 0.05$; Partial Eta Squared = 0.015). It was not a significant predictor of the extent to which participants had prepared their property at Wave 2 ($F(3, 501) = 0.38; p = 0.77, ns$). Owing to the unequal distribution of participants across the four cells of our predictor variable, we conducted a Levene’s test of equality of error variances in each of the analyses as well. This test showed significant results ($F(3, 972) = 4.52, p < 0.01$) for the analysis on the extent of planning participants had conducted at Wave 1, meaning the error variances between the four cells were found to significantly differ from each other, violating a key assumption for ANOVAs. We therefore examined the robust Welch and Brown-Forsythe F -statistics for this analysis as well. Since both F -statistics were still highly significant ($p < 0.005$ for each), we were able to maintain the conclusion that the age category of the youngest child in the household was a

significant predictor of the extent to which participants had planned their response to a wildfire threat at Wave 1.

For the analyses that showed a significant *F*-statistic, namely the prediction of the extent to which participants had prepared their property and planned their response at Wave 1, and the extent to which they had planned their response at Wave 2, we continued by calculating and examining parameter estimates, which compared households with very young (between 0 and 5 years old), young (between 6 and 11 years old), and teenage children (between 12 and 17 years old) to households without children under 18 years old. Significance levels of these pairwise comparisons are reported in Table II.

In line with H3, having children of any age under 18 years old in the household was related to participants completing a lower percentage of actions relevant to prepare their property for wildfires at Wave 1, compared to households without children under 18 years old. These differences had disappeared toward the end of the wildfire season (Wave 2). In addition, having very young children in the household was related to participants completing a lower percentage of actions relevant to planning their response to a wildfire threat early on in the wildfire season (Wave 1), compared to households without children under 18 years old. This difference was still significant at the second assessment point toward the end of the wildfire season (Wave 2).

INSERT TABLE II AROUND HERE

3.3. Testing H4a, H4b, H4c

To test whether households with children in different age groups differed in the variables spelled out in H4a, H4b, and H4c (i.e., their motivation to prepare, their perceived difficulty of preparing, and their lack of time to prepare), we conducted three univariate ANOVAs with the age category of the youngest child in the household (including a “no children under 18 years old” category) as the predictor and participants’ motivation to prepare, their perceived difficulty of preparing, and their lack of time to prepare as the dependent variables. Means and standard deviations of the dependent variables across the four cells of our predictor variable are reported in Table III.

The age category of the youngest child in the household was a significant predictor of participants’ motivation to prepare ($F(3, 994) = 5.57, p < 0.01$, Partial Eta Squared = 0.017), their perceived difficulty of preparing ($F(3, 994) = 3.25, p < .05$, Partial Eta Squared = 0.010), and their lack of time to prepare ($F(3, 994) = 12.45, p < .001$, Partial Eta Squared = 0.036). We again conducted a Levene’s test of equality of error variances in each of the analyses as well. This test showed significant results ($F(3, 994) = 4.12, p < 0.01$) for the analysis on participants’ motivation to prepare. We examined the robust Welch and Brown-Forsythe F -statistics for this analysis, and since both statistics were still highly significant ($p < 0.003$ for each) we were able to maintain the conclusion that the age category of the youngest child was a significant predictor of participants’ motivation to prepare.

We continued by calculating and examining parameter estimates, which compared households with very young (between 0 and 5 years old), young (between 6 and 11 years old), and teenage children (between 12 and 17 years old) to households without children under 18 years old. Significance levels of these pairwise comparisons are reported in Table III. In line with hypotheses 4a, 4b, and 4c,

participants living in households with very young and young children reported significantly lower levels of motivation to prepare (H4a) and higher levels of perceived difficulty of preparing (H4b) and lack of time to prepare (H4c) than households without children under 18 years old. Households with teenagers did not differ from households without children under 18 years old in this regard.

INSERT TABLE III AROUND HERE

3.4. Testing H5

To test the relationship between the age of the youngest child in the household and age of the adult, we ran a univariate ANOVA with the age category of the youngest child as the predictor and the age of the adult completing the survey as the dependent variable. This analysis yielded a significant relationship ($F(3, 994) = 94.93$, $p < 0.001$, Partial Eta Squared = 0.223). Due to a significant Levene's test ($F(3, 994) = 25.56$, $p < 0.001$) we examined the Welch and Brown-Forsythe F -statistics, both of which were highly significant ($p < 0.001$ for each), allowing us to conclude that the age category of the youngest child in the household was significantly related to the age of the adult completing the survey.

Parameter estimates were calculated to compare households with very young (between 0 and 5 years old), young (between 6 and 11 years old), and teenage children (between 12 and 17 years old) to households without children under 18 years old. Significance levels of these pairwise comparisons are reported in Table III. In line with Hypothesis 5, participants living in households with very young, young, and teenage children were younger than participants living in households without children under 18 years old.

3.5. The Role of Children's Age vs. Parents' Age

Finally, to test whether it is the children's age or the parents' age that is driving the effects in the analyses reported above, we conducted seven univariate ANCOVAs with the age category of the youngest child as a categorical predictor, the age of the adult completing the survey as a covariate, and the extent to which participants had prepared their property and had planned their response at Wave 1 and Wave 2, their motivation to prepare, their perceived difficulty of preparing, and the extent to which they reported a lack of time to prepare as the seven dependent variables respectively. Results are listed in Table IV.

Results showed that the effects of the age category of the youngest child on property preparedness and planning at Wave 1, planning at Wave 2, and participants' motivation to prepare, reported difficulty of preparing, and reported lack of time to prepare were no longer significant after controlling for the age of the adult completing the survey. The age of the adult completing the survey, however, did remain a significant predictor of all seven variables after controlling for the age category of the youngest child. The only effect of the age category of the youngest child that showed a marginal trend towards significance after controlling for the age of the adult completing the survey was the effect on the extent to which participants reported a lack of time to prepare. When examining the parameter estimates that compared with very young (between 0 and 5 years old), young (between 6 and 11 years old), and teenage children (between 12 and 17 years old) to households without children under 18 years old, households with very young children (Estimated $M = 4.56$, $SE = 0.20$) and households with young children (Estimated $M = 4.67$, $SE = 0.25$) reported a greater lack of time compared to households without children (Estimated $M = 4.13$, $SE = 0.07$; $t(5) = 1.91$, $p < 0.05$ (one-sided), and $t(5) = 2.09$, $p < 0.05$ (one-sided))

respectively). Households with teenage children did not differ significantly in their reported lack of time to prepare from households without children under 18 years old, $t(5) = 0.09$, *ns*.

INSERT TABLE IV AROUND HERE

4. DISCUSSION

The purpose of this study was to examine a factor that may be contributing to the vulnerability of children in disasters, namely the extent to which households with children have prepared themselves for the disaster. More specifically, we set out to test how prepared households with very young children, young children, or teenagers are compared to households without children under the age of 18 years old. We examined their preparedness in relation to one particular natural hazard, namely wildfires, and captured the extent to which households had prepared their property [and](#) had planned their response in case of a wildfire threat, both at the start of the wildfire season and toward the end of it. In addition, this study set out to examine several potential factors that might explain why parents with young and very young children might be preparing less compared to households without children (Basolo et al. 2009; Kirschenbaum 2006; Kohn et al. 2012; McNeill et al. 2013; Norris et al. 1999). The potential factors examined in this study were participants' age, their motivation to prepare and their perceptions about the difficulty of preparing and the time available to carry out preparatory activities.

A main finding of the current study was that having underage children, particularly very young children (<6), was related to lower levels of property preparedness and planning when compared to preparedness by households without

children under 18 years old early in the wildfire season. Also, while lower levels of preparing the property by parents with young and very young children appeared to even out by the end of the season, differences in household planning persisted. Furthermore, having young or very young children in the household was also related to reduced motivation and perceived ability to prepare, both due to an increased perceived difficulty of preparing and due to having less time available to do so.

Households with young children also tended to contain adults who, on average, were younger than the adults in households without underage children. Importantly, the findings of the current study suggest that the effects relating to wildfire preparedness, motivation to prepare, and difficulty were largely due to the age of the adults in the households rather than the age of the children (Basolo et al. 2009; Kohn et al. 2012; McNeill et al. 2013; Norris et al. 1999). Younger adults prepared less, were less motivated to do so, and perceived it as more difficult to prepare compared to older adults, regardless of whether they had resident children under 18 years old or not. The one exception to this was related to perceptions about the time available to prepare. After controlling for the participants' age, having young and very young children was still related to a greater lack of time compared to households without underage children. In other words, parents with young and very young children report a greater lack of time to prepare as compared to childless adults of a similar age.

Altogether these findings provide important new insights into potential causes for the fact that young children appear to be at greater risk of harm in the face of natural hazards compared to older children and adults. Still, results need to be interpreted bearing several limitations in mind.

4.1 Limitations and Directions for Future Research

First, this study relied on self-report and on a survey methodology, both of which can produce bias (e.g. social desirability, self-selection, respectively). Still, the sample was reasonably large, had specific hazard-relevant inclusionary criteria, and screened for aspects of biased responding.

Second, there are several limitations attached to the focus of the current study. In terms of child- and parent-related demographics, this study only examined the age of the youngest child in the household and the age of the respondent. Even though it ruled out number of children and one versus two parent households as additional factors at play, there are other child- and parent-related factors that were not investigated by the current study: for example, whether there's a stay-at-home parent, whether both parents have full-time jobs, whether any of the children have special needs and so forth. The current study also excluded a focus on extended families: for example, does it make a difference if grandparents live in the same area and have previous experience with natural hazards? In terms of the natural hazard focus, the current study focused solely on preparing for wildfires. More research is needed to examine whether similar relationships are found in relation to preparing for other natural disasters, such as floods, hurricanes, and earthquakes.

Third, linked to the limitations inherent in using a correlational methodology, no causal relationships can be inferred from the current data. To test causal relationships, future studies could be education- or intervention-based. For example, they could examine whether targeted education campaigns for parents of younger children enhance disaster risk reduction (DRR) motivation and behaviour. Current findings suggest the possibility that repeated testing might have worked similar to an intervention, with differential improvements seen between Wave 1 and 2 in

preparedness activities. Thus, in testing an intervention future research should consider using a no-intervention control, or more elaborated Solomon Four Group design, to rule out various threats to internal validity, including re-testing.

With these findings being the first to examine the role of children's age versus parents' age in household preparedness, replication is necessary, both within a wildfire setting and in relation to other natural disasters. In addition, future extension might consider a mixed methods sequential approach. The quantitative part would test for replication of the quantitative findings. A qualitative follow-up could then get more in-depth information to explore various facilitators and deterrents to preparing in households with children and parents of various age ranges.

5. PRACTICAL IMPLICATIONS

Practical implications of the current research include the transfer of current findings and implications into [early education](#), public and school preparedness education. This might include take home material for young children that is part of an easy to do at home task with parents (e.g., a discussion and filling out of a preparedness form; e.g., Ronan & Johnston, 2003). More generally, findings have implications for larger emergency management agency public education campaigns that, with the right targeting, could enhance motivation in families with younger children (and younger parents) to engage in household planning and preparedness. Beyond that, and more generally yet, based on the current findings it might be particularly useful to develop [parenting](#) campaigns (e.g., prenatal parenting courses) that are specifically targeted toward younger adults, including a focus on younger households with children. One focus there might be on helping them prioritise safety issues, including disaster preparedness and other major risks for child injury, and how

they might be able to do so with the busy lifestyles and many priorities often experienced by young families.

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Table I. Means (*M*), Standard Deviations (*SD*), and Intercorrelations (*r_{ij}*) Among Variables.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Gender ^a	0.59	0.49	-								
2. Age ^b	52.7	15.2	-	-							

	1	1	0.17**									
			*									
3. Motivation	7.12	1.50	0.06	0.24**	-							
				*								
4. Difficulty	4.55	1.97	0.08*	-0.11**	-	-						
						0.20**						
						*						
5. Lack of Time	4.21	1.93	0.05	-	-	0.68**	-					
				0.27**	0.28**	*						
				*	*							
6. Prop Prep W1 ^c	0.39	0.31	-0.08*	0.29**	0.46**	-	-	-				
				*	*	0.29**	0.33**					
						*	*					
7. Prop Prep W2 ^c	0.55	0.27	-0.13**	0.18**	0.23**	-	-	0.60**	-			
				*	*	0.19**	0.18**	*				
						*	*					
8. Planning W1	0.33	0.38	-0.04	0.16**	0.44**	-	-	0.68**	0.42**	-		
				*	*	0.33**	0.37**	*	*			
						*	*					
9. Planning W2	0.59	0.38	-0.07	0.13**	0.39**	-	-	0.48**	0.54**	0.64**	-	
					*	.017**	0.25**	*	*	*		
						*	*					

Note: All statistics are based on Wave 1 participants (Ns between 973 and 995) except for the descriptive statistics of and correlations with the Wave 2 preparedness

and planning variables, which was based on Wave 2 participants (Ns between 491 and 505).

^a Gender was coded 0 = male, 1 = female, other = missing

^b Age was scored from 18 to 80+ years old

^c Pro Prep W1 and W2 = Property Preparedness Wave 1 and Wave 2

Table II. Means (*M*) and Standard Deviations (*SD*) of Property Preparedness and Planning across Age of Youngest Child, and Pairwise Comparisons between Households with Very Young, Young, and Teenage Children versus Households without Children.

DV	Age of Youngest Child ^a							
	(1)		(2)		(3)		(4)	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
Property Prep W1	0.26**	(0.3	0.31*	(0.3	0.34*	(0.3	0.42	(0.3
	*	1)	n = 58	1)	n = 77	0)	n =	1)
	n = 96						753	
Planning W1	0.22**	(0.3	0.27	(0.3	0.29	(0.3	0.35	(0.3
	n = 96	5)	n = 58	5)	n = 77	7)	n =	9)
							745	
Property Prep W2	0.51	(0.3	0.55	(0.3	0.54	(0.2	0.55	(0.2
	n = 48	1)	n = 23	0)	n = 40	8)	n =	6)
							394	

Planning W2	0.44**	(0.3	0.56	(0.3	0.60	(0.3	0.60	(0.3
	n = 47	8)	n = 22	8)	n = 40	7)	n =	7)
							386	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, when comparing (1) (2) or (3) to (4); (1) = Youngest child between zero and five years old 2 = Youngest child between six and 11 years old, 3 = Youngest child between 12 and 17 years old, 4 = No children under 18 years old.

Table III. Means (*M*) and Standard Deviations (*SD*) of Motivation to Prepare, Perceived Difficulty of Preparing, and Lack of Time to Prepare across Age of Youngest Child, and Pairwise Comparisons between Households with Very Young, Young, and Teenage Children versus Households without Children.

	Age of Youngest Child							
	(1)		(2)		(3)		(4)	
DV	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
Motivatio	6.62**	(1.47)	6.77*	(1.70)	7.18	(1.29)	7.21	(1.50)
n	*		n = 59		n = 79		n = 764	
	n = 96							
Difficulty	4.93*	(1.86)	5.09*	(1.81)	4.42	(1.87)	4.47	(2.00)
	n = 96		n = 59		n = 79		n = 764	
Lack of	5.06**	(1.97)	4.99**	(1.79)	4.35	(1.82)	4.02	(1.90)
Time	*		*		n = 79		n = 764	

	n = 96		n = 59					
Age of	35.15*	(6.59)	41.69*	(8.68)	45.94*	(11.52)	56.50*	(14.51)
Adult	**		**		**	)	**	)
	n = 96		n = 59		n = 79		n = 764	

Note. * $p < 0.05$, *** $p < 0.001$, when comparing (1) (2) or (3) to (4); (1) = Youngest child between zero and five years old 2 = Youngest child between six and 11 years old, 3 = Youngest child between 12 and 17 years old, 4 = No children under 18 years old.

Table IV. Unique Predictive Effects of Age of Youngest Child and Age of Adult on Property Preparedness and Planning at Wave 1 and Wave 2, and Motivation to Prepare, Perceived Difficulty of Preparing, and Lack of Time to Prepare.

	Age of Youngest Child		Age of Adult	
	F-statistic (<i>df</i> , <i>df</i>)	Partial Eta ²	F-statistic (<i>df</i> , <i>df</i>)	Partial Eta ²
Property Prep W1	0.52 (3, 979)	0.002	58.70 (3, 979)	0.057***
Planning W1	0.55 (3, 971)	0.002	13.91 (3, 971)	0.014***
Property Prep W2	0.53 (3, 500)	0.003	17.37 (3, 500)	0.034***
Planning W2	1.06 (3, 490)	0.006	4.17 (3, 490)	0.008*
Motivation	0.75 (3, 993)	0.002	45.40 (3, 993)	0.044***
Difficulty	1.41 (3, 993)	0.004	6.15 (3, 993)	0.006*
Lack of Time	2.32 (3, 993)	0.007 [†]	43.35 (3, 993)	0.042***

Note. [†] $p < 0.10$, * $p < 0.05$, *** $p < 0.001$.