

## RESEARCH ARTICLE

# Effects of COVID-19 lockdown restrictions on parents' attitudes towards green space and time spent outside by children in Cambridgeshire and North London, United Kingdom

Kate Howlett  | Edgar C. Turner 

Department of Zoology, University of Cambridge, Cambridge, UK

**Correspondence**

Kate Howlett  
Email: kh557@cam.ac.uk

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**Abstract**

1. In the United Kingdom, children are spending less time outdoors and are more disconnected from nature than previous generations. However, interaction with nature at a young age can benefit wellbeing and long-term support for conservation. Green space accessibility in the United Kingdom varies between rural and urban areas and is lower for children than for adults. It is possible that COVID-19 lockdown restrictions may have influenced these differences.
2. In this study, we assessed parents' attitudes towards green space, as well as whether the COVID-19 lockdown restrictions had affected their attitudes or the amount of time spent outside by their children, via an online survey for parents of primary school-aged children in Cambridgeshire and North London, UK ( $n = 171$ ). We assessed whether responses were affected by local environment (rural, suburban or urban), school type (state-funded or fee-paying) or garden access (with or without private garden access).
3. Parents' attitudes towards green space were significantly different between local environments: 76.9% of rural parents reported being happy with the amount of green space to which their children had access, in contrast with only 40.5% of urban parents.
4. COVID-19 lockdown restrictions also affected parents' attitudes to the importance of green space, and this differed between local environments: 75.7% of urban parents said their views had changed during lockdown, in contrast with 35.9% of rural parents. The change in amount of time spent outside by children during lockdown was also significantly different between local environments: most urban children spent more time inside during lockdown, while most rural children spent more time outside.
5. Neither parents' attitudes towards green space nor the amount of time spent outside by their children varied with school type or garden access.
6. Our results suggest that lockdown restrictions exacerbated pre-existing differences in access to nature between urban and rural children in our sampled

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population. We suggest that the current increased public and political awareness of the value of green space should be capitalised on to increase provision and access to green space and to reduce inequalities in accessibility and awareness of nature between children from different backgrounds.

#### KEYWORDS

access, COVID-19, nature, nature deficit disorder, urban, value, wellbeing

## 1 | INTRODUCTION

Experiences in nature at a young age are important for developing a connection with the natural world and for engendering support for conservation later in life (Soga et al., 2016; Wells & Lekies, 2006), as well as benefitting children's mental and physical health, skill development and general wellbeing (Mygind et al., 2019; Richardson et al., 2017). However, there is an increasing disconnect between humans and the natural world (Soga & Gaston, 2016; Turner et al., 2004), now termed 'nature deficit disorder' (Louv, 2005). This is often blamed on rapid urbanisation and less daily contact with nature (Maller et al., 2009). As such, the importance of urban green spaces for residents' wellbeing is now accepted as central to good urban planning (Handley et al., 2011; Kaźmierczak et al., 2010).

However, in the United Kingdom (UK), current provision of green space is patchy (Barbosa et al., 2007), tending to be concentrated in more affluent areas (Pauleit et al., 2005; Turner et al., 2004). In the UK, over 2.5 million people live over a 10-min walk away from a green space, with provision calculated as just 32.94 m<sup>2</sup> per person, or just over a third of the area of the six-yard box on a football field (Fields in Trust, 2020). Access to green spaces is complex and determined by several factors, including distance from the home, perception of safety and individuals' demographic characteristics (Coombes et al., 2010; Dunton et al., 2014; Harrison et al., 1995). A large proportion of urban green space is often publicly inaccessible, existing as private land, especially as private household gardens (Mathieu et al., 2007). Access to a private garden varies with socioeconomic background and is generally higher for older individuals and those in higher income brackets (Judge & Rahman, 2020; Office for National Statistics, 2020). In the UK, 12% of households have no garden access, but this rises to 21% in highly urbanised areas such as London (Office for National Statistics, 2020), so disparity exists both within urban areas, and between urban and rural areas.

In addition, green space accessibility is lower for children than it is for adults, limited by urban barriers such as roads and parental restrictions on independent movement (Carver et al., 2008; Freeman & Quigg, 2009; Veitch et al., 2008; Villanueva et al., 2012). Across Europe and North America, the extent of children's independent movement has declined significantly in the last few decades (Fyhri et al., 2011; Karsten, 2005; Kytta et al., 2015; O'Brien et al., 2000; Shaw et al., 2013), partly driven by parental concerns around child safety (Timperio et al., 2004). As a result, a large proportion of green

space is inaccessible for children, especially in urban areas (Hand et al., 2018).

A higher proportion of green space close to a child's home has been linked with better cognitive functioning in children (Bijnens et al., 2020; Wells, 2000) and can be important for buffering stress (Wells & Evans, 2003), while a child's freedom to explore their local environment has also been linked to a range of health and social benefits (McCormick, 2017; Veitch et al., 2008). Exposure to the natural world during childhood has been shown to affect long-term cognitive development (Kellert, 2002, 2005; McCormick, 2017), as well as environmental attitudes, behaviours and values later in life (Strife & Downey, 2009; Wells & Lekies, 2006). However, evidence suggests that children's freedom to play locally, especially free from adult supervision, has declined in recent decades (Karsten, 2005), such that children now do not generally venture far from home on their own (Loebach & Gilliland, 2014). From 2013 to 2015, 12% of UK children under 16 had not visited a natural environment in over a year (Hunt et al., 2016), and fewer than one in 10 children in the UK now regularly play outside in wild places (Natural England, 2009). Collectively, these trends pose issues for children's wellbeing, as well as endangering future long-term support for conservation.

There is evidence that urban children, especially those from low-income backgrounds, are experiencing a nature deficit that affects their perceptions and awareness of nature (Aaron & Witt, 2011). For example, a survey of children conducted in the UK found that only one in three children could identify a magpie and only half could tell the difference between a bee and a wasp, despite 9 out of 10 being able to identify a dalek, a fictional extra-terrestrial race from the science-fiction series *Doctor Who* (Moss, 2012). Other studies have found that those children who have visited wild areas have a more accurate understanding of the wildlife that lives there (Aaron & Witt, 2011). Given that domestic gardens in the UK have been shown to house a surprising diversity of species (Davies et al., 2009; Smith et al., 2005, 2006), these spaces may represent a key pathway for tackling nature deficit disorder.

COVID-19 lockdown restrictions in the UK, brought in between March and July 2020, resulted in a nationwide closure of schools and limits on the amount of time that could be spent outside of the home, restricting children and adults to the green space to which they had immediate access. Internationally, similar restrictions have been linked with an increase in severity and incidence of mental health symptoms (Pouso et al., 2021), and an increase in people emphasising the importance of green spaces for wellbeing (Berdejo-Espinola

et al., 2021). Restrictions in different countries caused significant and varied changes in green space visitation rates. For example, in Oslo, Norway, recreational green space use increased by 291% during lockdown (Venter et al., 2020), while in the UK, there was an overall decrease in time spent visiting green space, with those from lower socioeconomic backgrounds experiencing the greatest decline (Burnett et al., 2021). Other studies suggest changes in the motivations for visiting green spaces, including a shift from 'non-essential' uses, such as meeting friends or observing nature, to 'essential' uses, such as dog walking, and an increase in associating these spaces with wellbeing benefits (Berdejo-Espinola et al., 2021; Ugolini et al., 2020).

Given the high degree of variation in the effects of lockdown restrictions on green space usage and attitudes, both between and within countries, we wanted to assess whether restrictions in the UK exacerbated or reduced differences in access to nature between urban and rural children. In particular, we assessed parents' attitudes towards green space, as well as whether the COVID-19 lockdown restrictions had affected their attitudes or the amount of time spent outside by their children, via an online survey distributed to 171 parents of primary school-aged children in Cambridgeshire and North London, UK from May to July 2020. Through this localised sample, we aimed to provide a snapshot of parents' and children's experiences of the COVID-19 lockdown restrictions in the southeast of the UK. We assessed whether responses were affected by respondents' local environment (rural, suburban or urban), the school type of their children (state-funded or fee-paying) or garden access (with or without private garden access). Our key hypotheses were as follows:

1. Parents in rural areas with private garden access would be more aware of the general importance of green space than those in more urban areas without access to a private garden.
2. The attitudes of parents in rural areas with private garden access would have been less influenced by the effects of lockdown restrictions than those of parents in more urban areas without access to a private garden, whose appreciation would have increased during lockdown.
3. Children in rural areas with private garden access would have spent more time outside during lockdown than those in more urban areas without access to a private garden.

## 2 | METHODOLOGY

### 2.1 | Data collection

We designed an online survey for parents of primary school-aged children in Cambridgeshire and North London, UK (Appendix S1). The survey was distributed in May to July 2020 through pre-existing relationships with Cambridgeshire primary schools and a tuition centre in North London, on social media (Facebook and Twitter) through the researchers' own accounts and through those of the University

Museum of Zoology Cambridge (UMZC), and via UMZC newsletters. The survey contained a mixture of closed and open questions.

### 2.2 | Survey content

We asked parents about three key demographic factors via multiple-choice questions: their local environment (rural, suburban or urban), the type of school their children attended (state-funded or free-paying) and whether or not their children had access to a garden (Appendix S1). We split state-funded schools into two categories, state and academy, since they reflect different management practices, although they are both free for children to attend. Academies are administratively free from local-authority control, while state schools are administered by their local authority with regards to admissions and day-to-day running. Private schools are paid for by parents and are not subject to local-authority control. We split green space access into four categories: private garden, communal garden, local park or none. In the UK, private gardens are spaces accessible only to those who own or rent the property it is attached to (Loram et al., 2007). Communal gardens are accessible only by those in a small collection of households, such as a block of flats, and are defined as open spaces managed by local community members for a range of purposes (Holland, 2004). Both garden access and school type are therefore reflective of household income and socioeconomic background. Collectively, these three factors represent key demographic parameters which might influence parents' attitudes and children's access to green space.

To assess parents' attitudes towards green space, we asked two open questions: 'Has your thinking on the importance of green space changed since lockdown began? Please explain how your views have changed or why they have not' and 'Do you have any other thoughts about green space and its impact on children's wellbeing or learning?', and one multiple-choice question: 'How do you feel about the amount of green space your children have access to?' with the options 'I would like them to have more access to green space', 'I would like them to have less access to green space' and 'I am happy with the amount of green space my children have access to' (Appendix S1). To ensure our sample of parents was unbiased with respect to nature engagement or pro-environmental attitudes, we asked about participation in the following three nature-friendly activities: regular feeding of garden birds or other wildlife (yes or no), encouragement of garden wildlife (yes or no) and participation in citizen-science nature projects (yes, no or no but planning to in the future) (Appendix S1).

To explore whether there had been an effect of the COVID-19 lockdown restrictions, we asked two closed questions: 'Has your thinking on the importance of green space changed since lockdown began?' with the options 'Yes' and 'No', and 'Are your children spending more or less time outside now than before lockdown began?' with the options 'My children are spending more time outside since lockdown began', 'My children are spending less time outside since lockdown began' and 'The amount of time my children are spending outside has not changed on account of lockdown' (Appendix S1).

Interpretation of results from the first of these questions was aided by responses from the first of the above open questions, asking them to elaborate on why their thinking had or had not changed.

## 2.3 | Research ethics

Electronic consent was required on the first page of the survey in order to proceed to the survey questions themselves. Respondents were provided with full Participant Information before being asked to provide electronic consent (Appendix S1). Participation was voluntary, and it was made clear to respondents that they were under no obligation to take part and that they could remove their consent at any point with no penalties. Our protocol was reviewed and approved by the Cambridge Psychology Research Ethics Committee.

## 2.4 | Data processing and analyses

All analyses were carried out in R Version 4.0.2 GUI 1.72 Catalina build and R Studio Version 1.3.959.

### 2.4.1 | Associations between factors

Responses to demographic factor questions were compared to distributions reported in national statistics (Department for Education, 2019; Green & Kynaston, 2019; Office for National Statistics, 2020; World Bank & United Nations Population Division, 2019a, 2019b). Chi-square tests with Holm's sequential Bonferroni correction were used to assess whether there were any associations between the three factors. Due to low numbers of respondents with access to only a local park or with no green space access, type of green space access was lumped into two categories: 'garden' and 'no garden', and termed 'garden access' for this and all later analyses.

### 2.4.2 | Parents' attitudes towards green space

Word clouds were produced from responses to the two open questions, separated by respondents' local environment, school type of their children and garden access. Each word cloud contained a maximum of 200 words, with a minimum usage of three per word. More frequent usage was denoted through a larger font size and more central positioning of the word. Answers to both open questions were combined for each individual respondent.

All responses were read through twice before identifying a set of common themes and sentiments within each of these themes. The responses were then read through for a third time to code for the presence/absence of the identified sentiments. Any sentiment included in two or more responses was included in our dataset. Chi-square tests with Holm's sequential Bonferroni correction were

used to assess whether there was a difference in the frequency of occurrence for each of the sentiments based on local environment, school type or garden access. Local environment, school type and garden access data were hidden during reading and coding to avoid biasing these processes.

Following the same processes as above, a set of commonly given reasons for the importance of green space were identified from the open responses, and responses were coded for their presence/absence. Any reason provided by two or more respondents was included. The reasons for the importance of green space were then ranked according to their frequency of occurrence among respondents. Chi-square tests with Holm's sequential Bonferroni correction were used to assess whether there was a difference in the frequency of occurrence for each of the reasons based on local environment, school type or garden access.

Finally, chi-square tests with Holm's sequential Bonferroni correction were used to assess whether local environment, school type or garden access affected parents' satisfaction with the amount of green space to which their children had access.

### 2.4.3 | Effects of COVID-19 lockdown restrictions

Chi-square tests with Holm's sequential Bonferroni correction were used to assess whether local environment, school type or garden access affected whether parents' thinking on the importance of green space had been affected by lockdown and whether the amount of time their children spent outside had changed during lockdown.

## 3 | RESULTS

Results are presented in the following order: breakdown of respondents' characteristics; investigation into associations between factors; parents' attitudes towards green space (descriptive word clouds, identification of common themes and sentiments, identification of common reasons given for the importance of green space, and satisfaction with the amount of green space to which their children have access); and effects of COVID-19 lockdown restrictions (change in thinking on the importance of green space and change in time spent outside by children during lockdown).

### 3.1 | Respondents

The survey received 171 responses in total, with 141 respondents providing answers to at least one of the two open questions. Respondents were spread across all local environments, school types and type of green space access, encapsulating the range of conditions reported in national statistics but not following exactly the same distributions (Department for Education, 2019; Green & Kynaston, 2019; Office for National Statistics, 2020; World Bank & United Nations Population Division, 2019a, 2019b) (Appendix S2).

### 3.2 | Associations between factors

There was a significant association between school type and local environment ( $\chi^2 = 12.2$ ,  $df = 4$ , adjusted  $p$ -value = 0.0471), with higher numbers of private schools found in more urbanised areas in our sample (Appendix S3). There were no associations between garden access and local environment ( $\chi^2 = 3.87$ ,  $df = 2$ ,  $p = 0.144$ ) (Appendix S3) or between garden access and school type ( $\chi^2 = 0.485$ ,  $df = 2$ ,  $p = 0.785$ ) (Appendix S3).

### 3.3 | Parents' attitudes towards green space

#### 3.3.1 | Word clouds

Each respondent's answers to the open questions 'Has your thinking on the importance of green space changed since lockdown began? Please explain how your views have changed or why they have not' and 'Do you have any other thoughts about green space and its impact on children's wellbeing or learning?' were grouped to form one open-text response, giving 141 responses in total. The most commonly used words were 'time', 'nature', 'space', 'wellbeing' and 'play', appearing in all word clouds (Figure 1). 'Always' and 'learning' were the next most common, appearing in every word cloud except that from respondents with no garden (Figure 1h). Exercise-associated words were also common, with at least one of 'exercise', 'walk' or 'walking', 'run' or 'running', or 'cycling' appearing in every word cloud except that from respondents with no garden (Figure 1h). The words 'health' and 'mental' appeared in every word cloud except those from respondents with no garden (Figure 1h) and respondents in rural areas (Figure 1a). All word clouds, except those from respondents with no garden (Figure 1h) and respondents whose children attended academy (Figure 1e) or private (Figure 1f) schools, contained words associated with gratitude, that is, at least one of 'grateful', 'lucky', 'appreciative' or 'appreciate'. Collectively, the common themes that emerged were exercise, mental health and gratitude.

#### 3.3.2 | Common themes and sentiments

Three common themes and 15 common sentiments were identified in the open-text responses (Table 1). The five most commonly expressed sentiments across all 141 open-text responses were (Figure 2): 'Always been grateful for or aware of the importance of green space' (42.6% of responses), 'Grateful for green space' (24.8% of responses), 'Became more grateful for green space during lockdown' (22.7% of responses), 'General importance of green space' (12.1% of responses) and 'Importance of local accessible green space' (11.3% of responses). There were no differences in the proportions of responses in which any of the sentiments were expressed between categories within local environment, school type or garden access (Appendix S4).

#### 3.3.3 | Reasons for the importance of green space

Sixteen reasons for the importance of green space were given by more than one respondent and thus identified as common (Table 2). Ranking the common reasons given for the importance of green space reveals broadly similar values placed on these spaces by parents from all local environments (Figure 3a), school types (Figure 3b) and garden access groups (Figure 3c). The five most popular reasons given for the importance of green space were (Figure 3): importance for spiritual wellbeing, space to play, space to exercise, importance for general learning (joint) and importance for mental health. There were no differences in the proportions of responses in which any of the reasons were reported between different categories of local environment, school type or garden access (Appendix S4).

#### 3.3.4 | Satisfaction with amount of green space

61.8% of respondents reported being happy with the amount of green space their children had access to, while 36.5% said they would like their children to have more access to green space (Figure 4). No respondents said they would like their children to have less access to green space. The proportion of parents who were happy with the amount of green space their children had access to differed significantly between local environments ( $\chi^2 = 14.4$ ,  $df = 2$ , adjusted  $p$ -value = 0.00224), being highest among rural parents and lowest among urban parents (Figure 4a). Neither school type ( $\chi^2 = 3.96$ ,  $df = 2$ ,  $p = 0.138$ ) (Figure 4b) nor garden access ( $\chi^2 = 1.56$ ,  $df = 1$ ,  $p = 0.211$ ) (Figure 4c) had a significant effect on parents' satisfaction with green space access.

### 3.4 | Effects of COVID-19 lockdown restrictions

#### 3.4.1 | Change in thinking on the importance of green space

54.1% of respondents said their thinking on the importance of green space had changed during lockdown, while 39.4% said their views had not changed (Figure 5). The proportion of parents who said their thinking on the importance of green space had changed during lockdown differed significantly between local environments ( $\chi^2 = 9.84$ ,  $df = 2$ , adjusted  $p$ -value = 0.0219), being lowest among rural parents and highest among urban parents (Figure 5a). Neither school type ( $\chi^2 = 0.197$ ,  $df = 2$ ,  $p = 0.906$ ) (Figure 5b) nor garden access ( $\chi^2 \sim 0$ ,  $df = 1$ ,  $p = 1$ ) (Figure 5c) had a significant effect on whether parents' attitude to the importance of green space changed during lockdown.

#### 3.4.2 | Change in time spent outside by children

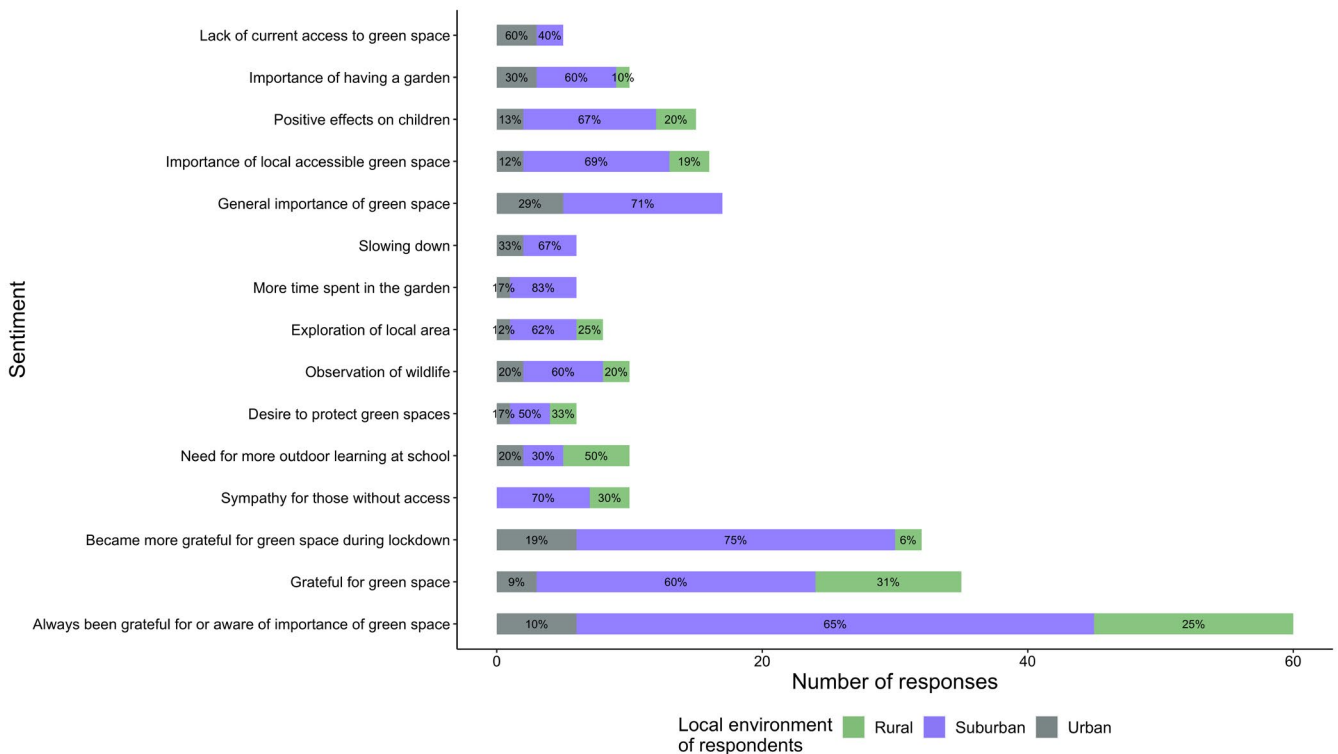
45.3% of respondents reported that the amount of time their children spent outside during lockdown had increased in comparison





**TABLE 1** Common themes and sentiments selected from responses to open questions from the survey for parents of primary school-aged children in the United Kingdom ( $n = 141$ ). The open questions were 'Has your thinking on the importance of green space changed since lockdown began? Please explain how your views have changed or why they have not.' and 'Do you have any other thoughts about green space and its impact on children's wellbeing or learning?'. Responses to the two questions were combined for each individual respondent. Any sentiment included in two or more responses was included. The sentiments are not listed here in any particular order other than being grouped by theme

Common theme	Common sentiment	No. of responses
Realisation	General importance of green space	17
	Importance of having a garden	10
	Importance of locally accessible green space	16
	Lack of current access to green space	5
	Positive effects on children (e.g. mood, behaviour)	15
Opportunity	More time spent in the garden	6
	Exploration of local area	8
	Observation of wildlife	10
	Slowing down	6
Attitude	Need for more outdoor learning at school	10
	Grateful for green space	35
	Sympathy for those without access	10
	Always been grateful for or aware of importance of green space	60
	Became more grateful for green space during lockdown	32
	Desire to protect green spaces	6



**FIGURE 2** Summary of common sentiments extracted from responses to the open questions 'Has your thinking on the importance of green space changed since lockdown began? Please explain how your views have changed or why they haven't.' and 'Do you have any other thoughts about green space and its impact on children's wellbeing or learning?'. Answers for the two questions were combined for each individual respondent, giving  $n = 141$  open-text responses. Bar chart shows total number of responses that contained each sentiment. Responses are coloured by local environment of respondents (Rural, Suburban, Urban) and grouped by common theme (Realisation, Opportunity, Attitude)

**TABLE 2** Commonly stated reasons given for the importance of green space in responses to open questions from the survey for parents of primary school-aged children in the United Kingdom ( $n = 141$ ). The open questions were 'Has your thinking on the importance of green space changed since lockdown began? Please explain how your views have changed or why they have not.' and 'Do you have any other thoughts about green space and its impact on children's wellbeing or learning?'. Responses to the two questions were combined for each individual respondent. Any reason given by two or more respondents was included. The reasons are not listed here in any particular order

Commonly stated reason for the importance of green space	No. of responses
1. Good for spiritual wellbeing	45
2. Good for mental health	18
3. Good for general health	16
4. Important for social interactions (e.g. with neighbours or friends)	5
5. Space to exercise	27
6. Space to play	32
7. Space to release energy	7
8. Good for creativity, imagination or curiosity	7
9. Important for general learning	27
10. Important for learning about nature	16
11. Important for learning social skills (e.g. resilience, self-confidence, developing personality)	4
12. Important for learning about growing food	4
13. As a counter to screen time	6
14. As a source of fresh air	11
15. Important for a sense of freedom	4
16. Important for building a connection to nature	8

spending more time outside. These results offer a snapshot into the relationship of parents and children to green space in a specific location within the UK during the COVID-19 pandemic in 2020.

## 4.2 | Parents' attitudes towards green space

Broadly similar values were placed on green space by parents from all groups, with themes of space, wellbeing, learning, play, exercise, nature and gratitude appearing in all word clouds. One of the most common sentences in the open-text answers was 'I have always been aware of the importance of green space', so this is likely responsible for the appearance of 'always' in all word clouds except one. These themes were mirrored by the most common reasons given for the importance of green space by parents from all groups: importance for spiritual wellbeing, space to play, space to exercise, importance for general learning and importance for mental health. This complements previous research in which some of the most common reasons given for visiting green space were for health, exercise, to relax and to unwind (Neil & Nevin, 2014), as well as more recent research in the context of the COVID-19 pandemic, which has demonstrated

an increase in the perceived importance of these spaces for wellbeing (Berdejo-Espinola et al., 2021; Pouso et al., 2021). However, our findings show a greater emphasis on benefits specific to children, such as play and learning, likely as a result of our target group being parents as opposed to the general population.

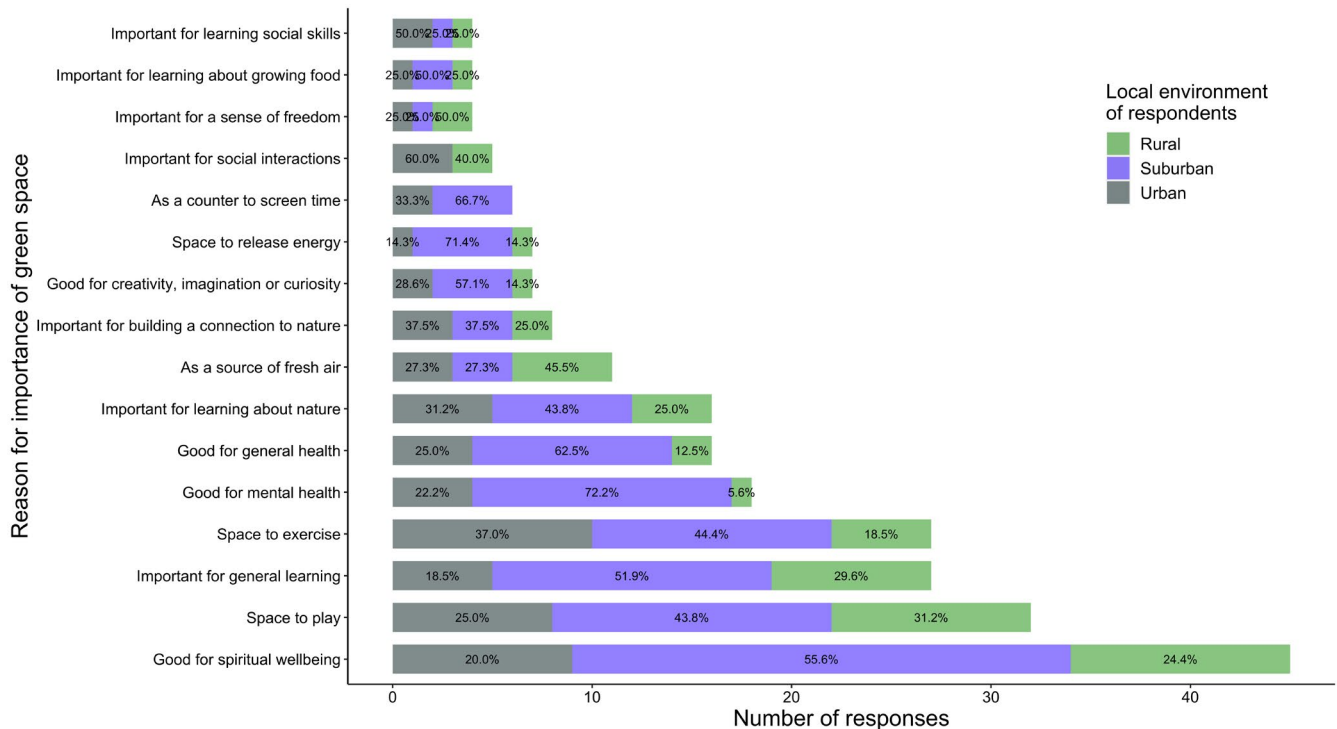
Gratitude for green space emerged as a key theme among the common sentiments extracted from open-text answers, featuring in the three most frequently expressed sentiments: 'Always been grateful for or aware of the importance of green space' (42.6% of responses), 'grateful for green space' (24.8% of responses) and 'became more grateful for green space during lockdown' (22.7% of responses). There were no significant differences in the sentiments expressed or reasons given for the importance of green space by parents from different local environments, school types or garden access. Our findings are in agreement with those from other studies in showing both a growth in people's appreciation for green space and in awareness of its importance, especially for wellbeing, over the lockdown period of March to July 2020 in the UK (Berdejo-Espinola et al., 2021; Campaign to Protect Rural England & National Federation of Women's Institutes, 2020; Pouso et al., 2021; Vivid Economics & Barton Willmore, 2020). Collectively, these results suggest broadly similar attitudes towards green space across parents of primary school-aged children in our sample population, regardless of local environment, school type or garden access, with gratitude for these spaces being ubiquitous across groups. Gratitude has frequently been associated with increased subjective wellbeing (Alkozei et al., 2018), so it is not surprising that gratitude was a key theme among responses, especially given that 'importance for spiritual wellbeing' was the most commonly given reason for the importance of green space.

The majority of parents surveyed said they were happy with the amount of green space to which their children had access, but this attitude was significantly more common among rural parents than urban parents in our sample. Previous studies have found the lowest levels of satisfaction with the availability of local green space in the UK among the most deprived groups in urban areas (Neil & Nevin, 2014), yet some of the most deprived communities of the UK are found in rural areas (DEFRA, 2019). As such, it would be useful to assess how satisfaction with local green space compares between rural and urban communities with comparable levels of deprivation, since the lack of satisfaction found among deprived urban communities might be more than that found among rural communities experiencing a similar level of deprivation.

## 4.3 | Effects of COVID-19 lockdown restrictions

The majority of parents surveyed said their thinking on the importance of green space had changed during lockdown, but this change was significantly more common among urban parents than rural parents in our sample. This supports findings from international research on the effects of lockdown restrictions, which identified changes in motivations for green space usage, an increase in





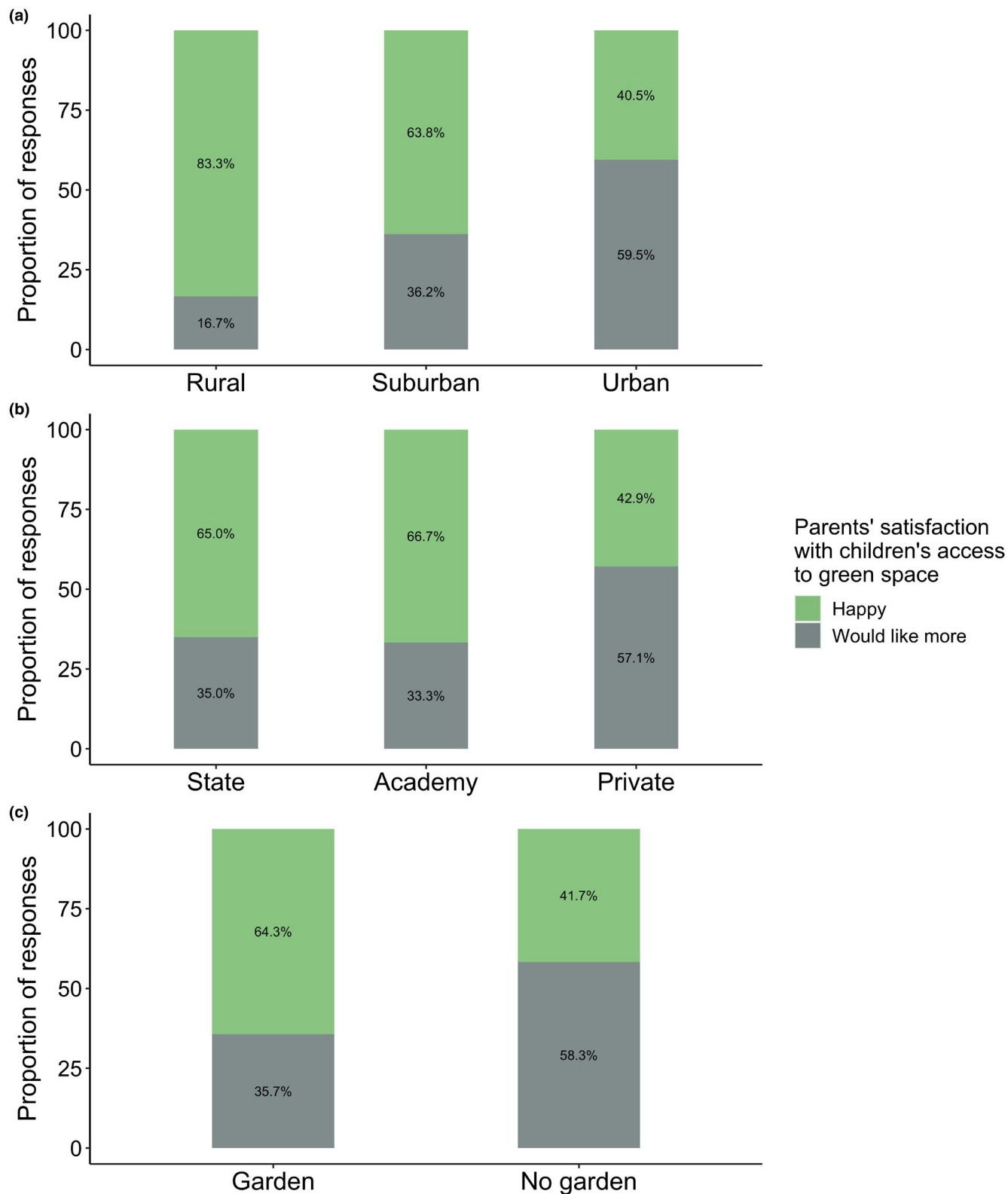
**FIGURE 3** Summary of reasons given for the importance of green space, extracted from responses to the open questions ‘Has your thinking on the importance of green space changed since lockdown began? Please explain how your views have changed or why they haven’t.’ and ‘Do you have any other thoughts about green space and its impact on children’s wellbeing or learning?’. Answers for the two questions were combined for each individual respondent, giving  $n = 141$  open-text responses. Bar chart shows total number of responses that reported each reason. Responses are coloured by local environment of respondents (Rural, Suburban, Urban)

appreciation for green space being important for wellbeing, and a need among urban residents for integrating urban green space within the built environment (Berdejo-Espinola et al., 2021; Ugolini et al., 2020). Most parents in our sample reported that the amount of time spent outside by their children had increased during lockdown in comparison to before, although the proportion of urban parents reporting this was significantly lower than the proportion of rural parents. This is in contrast with the Natural England People and Nature Survey, which found that the majority of children in the UK were spending less time outside during lockdown (Natural England, 2020a), in contrast with the majority of adults reporting that they were spending more time outside (Natural England, 2020b). However, these studies also found significant variation around these trends, associated with household income, age, ethnic group, local deprivation, health and the presence or absence of children in the household. Our results suggest there may also be significant differences between rural and urban groups.

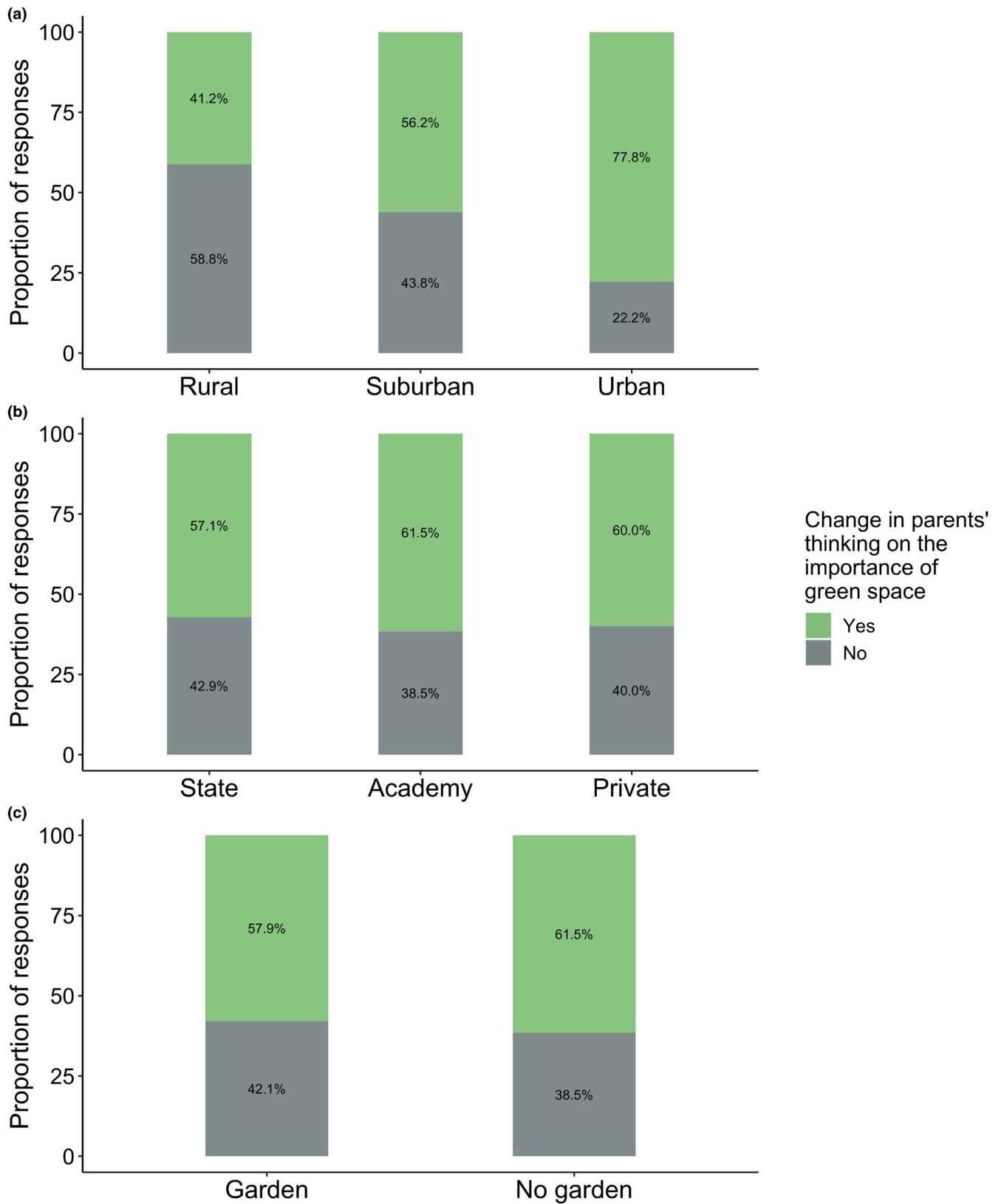
Overall, the results from our sample suggest that urban parents’ thinking on the importance of green space changed during lockdown, that their children spent less time outside during this period than they had before, and that they would like their children to have greater access to green space, while the reverse pattern was true for rural parents. This suggests that lockdown may have exacerbated pre-existing differences in access to green space between the rural and urban communities in our sample. This complements other

research that suggests lockdown restrictions in the UK sustained, and possibly exacerbated, green space inequalities across different socioeconomic groups (Burnett et al., 2021). In similar research comparing the effects of restrictions in countries across Europe, urban residents expressed a need for integrating urban green space within the built environment (Ugolini et al., 2020), while urban green and blue space was found to be important for buffering the negative effects of the pandemic on mental health across Europe, North America and Australasia (Pouso et al., 2021).

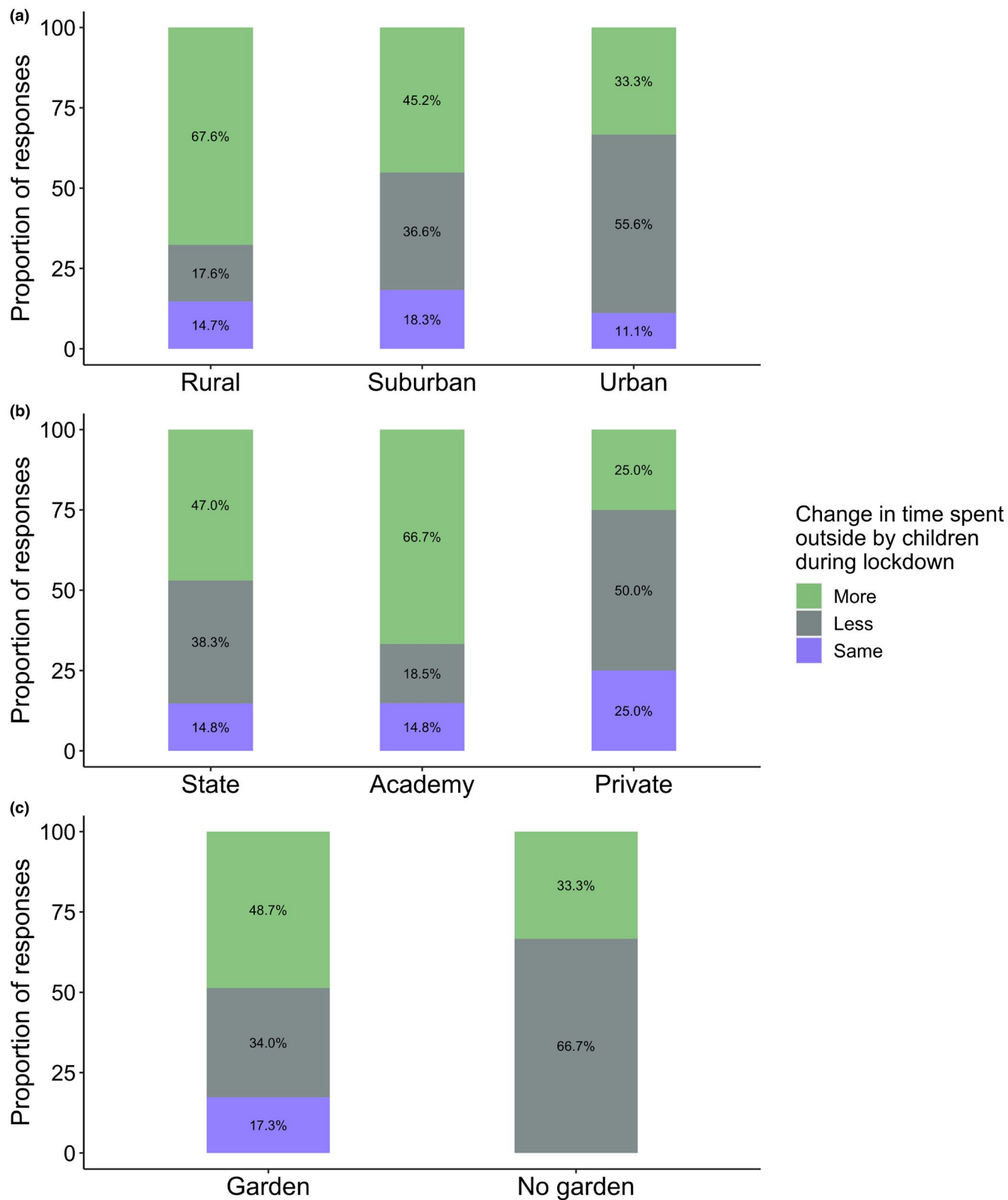
We also found a non-significant trend in change in time spent outside during lockdown based on school type in our sample: for private-school pupils, more respondents reported spending less time outside, but for state-funded pupils, more reported spending more time outside. This could reflect the differing amounts of structured work provided by private- and state-funded schools during lockdown (Cullinane & Montacute, 2020; Green, 2020), potentially reflecting differential resource availability (Henshaw, 2018) and suggesting that children at private schools spent more time on indoor, structured learning, while children at state-funded schools spent more time on outdoor, unstructured play. If this is the case, it has important and contrasting implications for the wellbeing and education attainment of primary school-aged children during lockdown. It is possible that pre-existing education attainment gaps between private- and state-funded schools may have been exacerbated during this period (Hemsley-Brown, 2015), while the wellbeing of privately



**FIGURE 4** Responses to the multiple-choice question 'How do you feel about the amount of green space your children have access to?' ( $n = 167$ ) from the survey for parents of primary school-aged children in the UK, excluding responses of 'I don't know'. (a) Responses grouped by local environment of respondents. (b) Responses grouped by school type of respondents' children. (c) Responses grouped by garden access. No respondents chose the answer option 'I would like them to have less access to green space.'



**FIGURE 5** Responses to the multiple-choice question 'Has your thinking on the importance of green space changed since lockdown began?' (n = 159) from the survey for parents of primary school-aged children in the UK, excluding responses of 'I don't know' and 'Prefer not to say'. (a) Responses grouped by local environment of respondents. (b) Responses grouped by school type of respondents' children. (c) Responses grouped by garden access



**FIGURE 6** Responses to the multiple-choice question 'Are your children spending more or less time outside now than before lockdown began?' ( $n = 163$ ) from the survey for parents of primary school-aged children in the UK, excluding responses of 'I don't know'. (a) Responses grouped by local environment of respondents. (b) Responses grouped by school type of respondents' children. (c) Responses grouped by garden access

educated children may have suffered as a result of reduced time spent outside in green space (Ergler et al., 2013).

#### 4.4 | Implications

Important limitations of this study are the small sample size, with only 171 responses restricted to Cambridgeshire and North London in the UK, a small number of respondents with no garden access, and an uneven representation of different local environment types, school types and garden access. However, proportions were comparable to the distributions among these categories in the UK as a whole, based on nationally representative datasets (Department for Education, 2019; Green & Kynaston, 2019; Office for National Statistics, 2020; World Bank & United Nations Population Division, 2019a, 2019b). Nonetheless, the significant results and trends found here merit further research and investigation across larger sample groups, since they provide a snapshot of parents' and children's experiences of the COVID-19 lockdown restrictions in the southeast of the UK.

Our results have implications for children's wellbeing, connection with nature and future long-term support for conservation and ecology (Chawla, 2015, 2020). Lockdown may have exacerbated pre-existing differences between urban and rural children's access to nature and opportunities to form personal experiences and memories in the natural world, something that is known to have important implications for development, future wellbeing and likelihood of future pro-environmental behaviours in children (Kellert, 2002, 2005; Strife & Downey, 2009; Wells & Lekies, 2006). In our sample, these differences manifested themselves during lockdown in differing amounts of time spent outside by urban and rural children and in differing parental attitudes towards green space. Given children's increasing disconnection from nature, particularly among urban groups (Aaron & Witt, 2011), it is important that this trend is investigated in children from different backgrounds in order to ensure interventions are targeted towards those children most at risk of developing a larger nature deficit.

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#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

#### AUTHORS' CONTRIBUTIONS

E.C.T. and K.H. conceived the idea and designed the study; K.H. collected the data; K.H. analysed the data and wrote the initial draft of the manuscript. Both authors commented on the manuscript and gave final approval for publication.

#### DATA AVAILABILITY STATEMENT

Data deposited in the Dryad Digital Repository <https://doi.org/10.5061/dryad.0zpc866zj> (Howlett & Turner, 2021).

#### ORCID

Kate Howlett  <https://orcid.org/0000-0002-1020-9161>

Edgar C. Turner  <https://orcid.org/0000-0003-2715-2234>

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