Scientist encounters: Igniting parental aspirations to support young scientists – a pilot study

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Abstract This paper reports findings from a pilot study undertaken at the Lancashire Science Festival to explore the impact of interacting with a scientist on parents' attitudes towards their child pursuing a career that involves science. Parents were asked a series of questions about their science festival experience and to provide some demographic information. The key finding was that half of the respondents reported that meeting a scientist had made them more likely to think that their child could pursue a career related to science. The attitudinal shift was particularly prevalent amongst parents from low-participation backgrounds. This preliminary finding suggests that interactions between scientists and parents at public science events may offer an avenue by which to foster positive perceptions of science as a career path amongst under-represented groups.

Key words: Widening participation; science festivals; parental attitudes; attitudes to science

Introduction

Science festivals have gained global popularity over the past decade as part of an ongoing drive to raise participation in science, especially amongst young people from under-represented groups. Science festivals offer an opportunity for people to engage with and learn about science in an informal setting (Bultitude et al., 2011). For universities, hosting a science festival is also seen as a way of encouraging members of the public onto campus who might not otherwise visit; many UK universities, for example Swansea, Cambridge and the University of Central Lancashire (UCLan) now host science festivals.

Attendance at a university-based science festival has been associated with a positive attitudinal shift towards science among parents (Rawlinson et al., 2021) that is most pronounced amongst attendees from more deprived backgrounds (Canovan, 2019). This is important because level of family interest in science is a significant factor in young people's levels of STEM participation (Dabney et al., 2013) and especially so for young people from low socio-economic status (SES) backgrounds (DeWitt et al., 2016).

The study described in this paper seeks to identify aspects of the science festival experience that might be influential in altering parents' perceptions about science and scientists. Research suggests that interacting with a scientist is an important aspect of satisfaction with the festival experience generally (Manning et al., 2013), and can positively change young people's knowledge of potential science careers and their perception of scientists – including the notion that anyone can be a scientist (Illingworth et al., 2015). However, to our knowledge this effect had not been tested in parents.

With this in mind, we designed a study to explore the potential impacts of meeting a scientist at a public science festival on parents. We identified two research questions:

1. Could meeting a scientist change parents' views of their child pursuing science as a career?
2. How does meeting a scientist at a university-based public science festival affect parents' perceptions of scientists?

Methods

In order to investigate the above questions, we designed a research study to be conducted at the Lancashire Science Festival (LSF) in 2021. The festival, which is hosted by UCLan, is held annually and consists of two days of school visits followed by a community day which is open to the public. The target audience for the latter is primary-age children and their families.

We set up a stall on the LSF 'show floor' during the community day and invited adults visiting the festival to take part in our research. Participation involved answering a series of multiple

choice and free-text questions about encounters with scientists at the festival. A small amount of demographic information was gathered, including sex and postcode, which was used as a proxy for SES using the Indices of Multiple Deprivation (IMD) metric[i]. Participants were also asked whether they had studied science post-GCSE, and whether they had studied at university. Quantitative results were analysed using Microsoft Excel, and qualitative results were analysed using an inductive thematic approach. The research methodology was approved by the UCLan Ethics Committee.

Results

Demographics

We had a total of 153 responses: 55% female and 45% male. We were able to collect IMD from 133 participants, which showed an over-representation of the most affluent households (deciles 8–10) in our sample compared to all festival attendees (47% compared to 35%).

Our sample had undertaken more formal education than the population as a whole, with 70% stating they had studied at university compared to 65% of festival attendees and around 42% of the working-age population (Office for National Statistics, 2017). Many participants had a pre-existing relationship with science, with 82% having previously spoken to a scientist, and 59% having studied science after GCSE-level[ii]. Furthermore, in the qualitative responses 17 participants self-identified as either scientists or science enthusiasts. When considering our results, it is important to bear in mind that our sample is not representative of the general population in this respect.

Impact of meeting a scientist on parents' views of whether their child could pursue a career that involved science

Most participants (84%) said they had met a scientist at the science festival in some capacity, with 81 (53%) speaking directly to a scientist and 68 (44%) watching a scientist give a talk[iii]. Participants who had not studied at university were less likely to report having spoken directly to a scientist at the science festival than those that had studied at university (41% and 58%, respectively). Similarly, only 37% of participants who had never

previously spoken to scientist reported speaking to a scientist at the science festival, compared with 57% of those who had.

We wanted to know whether meeting a scientist had changed parents' perceptions of science as a potential career for their child. We received 131 responses, half of which (65) said that the encounter had made them 'more likely' to think that a child in their care could pursue a job that involved science, with the remaining 66 reporting 'no change' in their views. No participants answered 'less likely'.

Between-group differences in responses to this question were observed. Specifically, 57% of participants who lived in an area of high deprivation reported a positive change, compared with 40% of those from an area of low deprivation. Similarly, 71% of participants who had never previously encountered a scientist said that the meeting had made them more likely to think that their child could pursue a career involving science, compared to 46% of participants who had met a scientist previously.

In total, 91 participants provided a qualitative elaboration as to why the interaction either had (n=44) or had not (n=47) changed their view. Table 1 gives the five most common reasons provided by each group. For the group who reported improved views of science careers for their children, reasons given included both those attributed to their child's experience and to their own. Of those who answered that their view had not changed, the most common single reason given was that they were open-minded over their child's future career possibilities. However, taken collectively, the responses given by this group tended to relate to their, or their child's, pre-existing interest or involvement in science.

Table 1 Responses to: 'Has meeting a scientist made you more or less likely to think that your child could have a job that involves science?' Please explain why.'

More likely		**No change**	
13	Increased knowledge of the breadth of career and subject possibilities related to science	13	They were happy for their child to pursue whatever career they preferred, including science
11	Their child was already interested in science	12	The parents were scientists themselves or science enthusiasts
10	Scientists are normal people/anyone can be a scientist	10	Their child was already interested in science
6	The event increased their child's interest in science	7	Their child wasn't interested in science
5	The parents were scientists themselves or science enthusiasts	5	They had always wanted their child to have a career in science

How meeting a scientist affected perceptions of scientists

We also asked participants how well the scientist(s) they met aligned with their previous ideas of a scientist. The majority response was that the scientist had fit their previous perception (105/122), with only 17 saying that they had not. There were no demographic differences in answers to this question.

When asked in what way their perception of scientists had or had not changed, over 75% of those who responded (70/95) described the demeanour of, or ascribed a quality to, the scientist(s) they had met. These descriptions were overwhelmingly positive, suggesting that meeting a scientist had been a valuable aspect of the science festival experience. Scientists were described as 'normal' or 'just like me', as well as 'friendly', and 'enthusiastic'.

Amongst the small group for whom meeting a scientist had changed their perception (*n*=13), this had been because positive encounters had changed negative (or at least limited) preconceptions. The scientist(s) who were interacted with were described as more approachable, down to earth or 'a lot more

chilled' than expected. One respondent described the scientist they met as 'Friendly and informative, other scientists give me the feeling that they're not quite on this planet'.

A second theme was identified relating to the diverse demographics of the scientists encountered – their age, gender or ethnicity. Although the total number of mentions was small (10), this aspect was mentioned by 5/13 of those who had had their perception changed. For example: 'Lots of variables, more females represented & other more diversity in the science population than experienced previously. Age demographic younger'.

Discussion

This study sought to explore the impact of meeting a scientist at a public science festival on parental views of science as a potential career pathway for their child, and on views of scientists more broadly. The key finding was that half of respondents reported that meeting a scientist had made them more likely to think that their child could pursue a career related to science. The reasons given for this shift included changes in their own knowledge and perceptions, suggesting that interactions with scientists can be an influential aspect of the science festival experience for parents.

This finding is particularly significant given that the science festival audience is much more scientifically literate than the general population, and that several of our sample self-identified as practising scientists. Furthermore, it is also noteworthy that parents were more likely to report a change in their perception if they came from an area of high deprivation or did not have a pre-existing relationship with science. Taken together, these findings suggest that the impact of science festival participation on parental views of science careers could be even larger for lower-participation groups. However, our data suggests these groups are less likely to engage in conversation with scientists during a science festival. This would suggest further intervention is necessary to overcome this barrier.

Although most parents did not report any change in their perception of scientists following their interaction, meeting a scientist reinforced positive views and corrected negative

preconceptions amongst the small proportion who found their conception changed. The finding of positive effects of interacting with a scientist is supported by the literature, and again our data suggests that impacts could be greater if lower-participation groups were involved.

Conclusion

This was a small-scale pilot study at a single time point and single event, and as such firm conclusions cannot be drawn. However, the findings suggest that interactions between scientists and parents at public science events may offer an avenue by which to foster positive perceptions of science as a career path amongst under-represented groups.

Further research with samples drawn from a less science-literate cohort would be useful in exploring our preliminary findings. A methodology that selected participants randomly from the registration details of all festival attendees would be more robust in this regard than the self-selection used in this study.

[i] The Indices of Multiple Deprivation are datasets used within the UK to classify the relative deprivation of small areas.
[ii] GCSEs are academic qualifications awarded in England, Wales and Northern Ireland following public examinations, normally at age 16.
[iii] Participants were able to select more than one option.

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