RESEARCH ARTICLE

Is Being a Young Researcher Always a Positive Learning Experience?

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Abstract

Over the last twenty years there has been considerable interest in teaching children and young people to become social science researchers to empower their voices and give them an opportunity to develop new skills. However, there is a dearth of systematic and detailed enquiry into young people's perspectives on their feelings and experiences as they learn how to be social science researchers. We asked seven young researchers aged 12 years (1 male and 6 females), who attended an after-school research club, to complete a questionnaire about the feelings they experienced as they learned about and undertook a range of activities during the various stages of their research (e.g. the creation of a research question, the design of a questionnaire, analysis of data, and public dissemination). The young researchers also participated in follow-up, individual, semi-structured interviews when they explained their questionnaire responses in detail. Our thematic analysis, and plots of how feelings changed across research stages, suggest that in the short term the young researchers' engagement in self-directed research was at times problematic: it produced a range of negative feelings involving worry, uncertainty, tiredness and disenchantment. However, these negative feelings were experienced alongside a range of positive feelings associated with motivation, mastery and achievement. Feelings were, therefore, not simply positive or negative, but were always mixed and diverse. Findings from group interviews conducted eight months later suggest that overall the young researchers greatly valued their experience particularly in terms of the opportunity to engage in "proper thinking" which was not always possible in the classroom. Broader implications of these findings are discussed, including the value of informal learning in after-school clubs which are outside the constraints of the English classroom curriculum.

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Introduction

Over the last twenty years there has been considerable interest in teaching children and young people to become social science researchers in their own right. However, to date, we have only very limited information about the feelings and experiences of these individuals when carrying out their research. Alongside this paucity of research into the experiences of young researchers, there is a similar lack of information about adult researchers' feelings and experiences. As a consequence, there is little information and guidance available for those who are involved in working with young researchers (YRs). There is, therefore, a need to paint a more complete picture of YRs' experiences so that adequate support can be provided by the adults who facilitate YR opportunities. The current investigation seeks to begin to fill this important gap by taking an interdisciplinary perspective which utilises psychological research methods to explore the feelings experienced by young people who are learning how carry out

their own social science research.

Background disciplines

The notion of a 'young researcher' arose from the field of Childhood Studies in response to the publication of article 12, Respect for the Views of the Child, of the United Nations Convention on the Rights of the Child (UNCRC, 1989). It is associated also with the development of the 'new sociology of childhood' which aimed to gain a better understanding of children's perspectives on their own lives (e.g. Cosaro, 2005). From these beginnings, studies have evaluated whether or not children's and young people's voices can be emancipated and their agency and participation enhanced if they are enabled to use data from their peers to have themselves heard and support arguments for change (e.g. Graham, Simmons & Truscott, 2017; Michail & Kellett, 2015; Mitra & Serriere, 2012; Bucknall, 2012; Cheminais, 2012; Kellett, 2005; Fielding & Bragg, 2003; Fielding, 2001). Recently, there has been an interest in youth participatory action research (YPAR) where young people work with peers or adults on joint research which can be used by the young people to evidence the need for change within institutions such as schools (e.g. Cammarota & Fine, 2008). Moreover, Kerawalla (2014) has illustrated how 'inclusive inquiry' led by children and young people can empower them to become advocates for the opinions of all research participants, adults as well as children. Thus, the majority of initiatives involving YRs have been concerned with the promotion of young people's voices, rights and participation, and evaluations of such initiatives have focused on the extent to which these outcomes are met. As a result, little attention has been paid to describing and evaluating YRs' perspectives on the process of carrying out their own research – what it feels like to be a researcher, in the moment. To address this absence, the current study adopts an interdisciplinary perspective and provides a detailed report on the positive and negative feelings experienced by seven young researchers while they learnt how to conduct their own social science research from conception to dissemination.

Our interdisciplinary orientation reflects the nature of the Children's Research Centre at the Open University, UK which has in recent years adopted this approach to explore all aspects of YRs' experiences by drawing upon the perspectives of colleagues working in the fields of Childhood Studies, Psychology, Education and Technology-Enhanced Learning. The authors of the current paper are members of the Children's Research Centre and, as psychologists in the field of education and learning, we have an interest in utilising the qualitative and quantitative research techniques of our discipline and that of education to better understand YRs' experiences as they learn how to conduct their own research.

Prior to the present investigation, we have employed interdisciplinary research methods to investigate what a group of seven YRs learnt by doing their own research (Kerawalla & Messer, 2017). The findings suggest that research led by young people can result in them developing new understandings about the research process, provide them with opportunities to develop new research skills, and can facilitate young people's awareness of the personal characteristics required of a social science researcher (*ibid.*). The same group of YRs were asked also for accounts of their emotional experiences of learning about and doing their own social science research and it is this part of the larger study which is reported here. Hence, our current focus moves beyond the important issues of empowering young people to bring about change or to learn new skills; here we are concerned with the experiences and feelings of YRs.

Researchers' feelings and emotions

The paucity of investigations into YRs' and adult researchers' feelings and emotions may be because these processes have tended to be relegated by positivist approaches to the position of an "unwanted consequence" (Cosaro, 2005, p. 32). This perspective is reflected in the impersonal narrative style of most research reports that are written by adults and is often replicated in the style of reports and presentations made by young researchers. Consequently, most formal research papers, reports and presentations offer a disembodied view of the research process and render the researcher invisible (Broussine et al., 2014). These disembodied artefacts, and the dissemination of them, have often been regarded as a desirable product of research led by YRs and previously have been used as evidence that YRs have engaged in opportunities to have their voices heard (e.g. Kellett, 2010). However, this focus on tangible impersonal *products* appears to have been at the expense of evidencing the YRs' perspectives on their *real-time experiences* i.e. what it feels like to learn about, and do, research in the moment, and how feelings change as research progresses.

It is of relevance also that feelings and experiences are ignored in the majority of texts that offer guidance for adult social science researchers (e.g. Coolican, 2014) and for adults who support YRs (e.g. Worrall, 2000; Fielding & Bragg, 2003; Kellett, 2005; Handscomb, 2009; Bucknall, 2012; Cheminais, 2012; Kim, Sheehy & Kerawalla, 2017), which focus primarily on the technical aspects of research. They offer recipes that break down research process into a series of tasks i.e. what needs to be done, rather than considering the researcher's feelings during the execution of the tasks, and what might provoke them (e.g. Roberts, 2007; Broussine, Watts & Clarke, 2014). As a consequence, we lack information about how it feels to learn how to be a researcher, whether the individual is an adult or young person.

Many schools and teachers support the notion of child-led research as a rich learning experience but most previous research into YRs' experiences has taken place in semi-formal settings such as after-school clubs or lunch-time clubs. This is usually because these settings can give YRs the freedom to explore personal interests and engage in long-term project work outside the constraints of the formal school curriculum (e.g. Jones, Blake & Petrou, 2012). Attendance at semi-formal research clubs is usually voluntary and young people can choose to stop their research at any time (e.g. Kellett, 2010). It is notable that much of the literature on learning in these semi-formal settings appears to focus on the *benefits* e.g. learners' positive feelings such as the enthusiasm, high levels of enjoyment and personal satisfaction that are experienced as a result of engagement in voluntary, self-directed learning (e.g. Stocklmayer, Leonie & Gilbert, 2010). Similarly, recent studies about supporting YRs in schools and community settings in the United Kingdom (e.g. Burton, Smith & Woods 2010; Cox & Robinson-Pant, 2008) and further a field (e.g. Graham, Simmons & Truscott, 2017; Michail & Kellett, 2015; Mitra & Serriere, 2012; Robson et al., 2009) have discussed some of the challenges faced by the adults who support YRs but evaluate only the *benefits* for the YRs themselves. This focus has meant that the possible negative aspects of YRs' experiences remain largely unexplored.

There are a small number of studies which report some negative aspects of YRs' experiences, although the main focus of the studies concerned positive outcomes. In a relatively brief inquiry, Bucknall (2012) found that YRs claim that doing their own research (in school lunchtime clubs in the United Kingdom) is 'enjoyable' and 'fun' (p. 196), but sometimes 'hard', time - consuming and stressful (p. 197). In a more recent study, Graham, Simmons and Truscott (2017) evaluated whether involvement in child-led research, facilitated by a community welfare organisation in Australia, could benefit the young researchers' well being. They report positive benefits such as increases in confidence and self-esteem. However, it is interesting that several of the quotes from the interviews with the YRs also contain reference to negative feelings such as worry, embarrassment and nervousness. These feelings were associated with the YRs' perceptions of research as sometimes being "hard" or "difficult" and that some of their peers were "struggling" (p.198). Moreover, one of the facilitators of this child-led research initiative is reported as saying that the young researchers (aged 10-14 years) were aware that they were being asked to do something that is usually done mainly by adults and that sometimes they "didn't have the capacity to do some of the things being asked of them" (p.198). The facilitator also reported how one parent described how her son had been "…stressed out all week because he hadn't completed this, he didn't understand…" (p. 198). These accounts are brief, but they are also important as they suggest that more research is needed which explores, in detail, the full range of feelings experienced by YRs, from their perspectives, and when and why these various feelings occur.

There are specific questions that need addressing, such as: What feelings are associated with creating a questionnaire or conducting an interview for the first time? What feelings occur when disseminating research to adult strangers in new settings? There are also more general questions such as whether self-directed research is always associated with positive affect or do negative feelings arise as well? And there are questions as to whether feelings change across the different stages of research process? Questions such as these need to be asked because feelings are "an essential part of the living texture of the research process" and "the researcher is not a distant, neutral observer, but a living, breathing, emotionally engaged participant" (Weeks, 2009, p.5). In addition, it is important to understand whether opportunities where young people conduct their own research are, from their perspective, a 'good thing'. Answers to these questions can provide a better understanding of whether young researchers always enjoy what they do, what type of emotional support they may need, and when.

Given the paucity of previous in-depth research into YRs' feelings and given a tendency for previous research to dwell on the positive aspects of YRs' experiences, we were interested in the nature of positive and negative feelings, and in particular whether there are problematic aspects to the empowerment and education of young people in this way. Negative feelings seemed to be a real possibility because the transfer of responsibility and decision making to YRs could be associated with uncertainty and worry as they embark on a self-directed journey that requires a high level of commitment and responsibility in diverse and novel social settings. We know very little about the consequences of these responsibilities and the perceptions of young people in response to these demands. Consequently, one of our aims was to ask YRs about any negative perceptions and experiences, why these arose, and how these made them feel. It should be acknowledged that YRs who have worked with us previously suggest that there are also many positive and transformational experiences (Kerawalla & Messer, 2017). Thus, the aim of the current research was to gain a rich understanding of the full range of research-related feelings experienced by YRs, from their perspective.

These concerns and interests resulted in the following research questions about child-led research carried out in an after-school club (whose activities extended into the YRs' homes, communities, and a local University as described in more detail below):

1. What feelings do YRs report whilst learning how to carry out social science research and what explanations do they provide about these feelings?
2. What is the extent and frequency of the feelings reported by the Yrs?
3. How do YRs' feelings change during their research project?
4. What were the YRs' long term reflections on their experiences?

Methodology and methods

We adopted a socio-cultural psychological perspective which is consistent with an interpretive paradigm. This enabled us to explore the subjective experiences of the YRs (Punch, 2014) and how they constructed meanings as they engaged in new learning experiences (Vygotsky, 1978). This psychological theoretical approach has been widely adopted in the field of education (e.g. Littleton, Wood & Staarman, 2010). Our approach to data collection follows that adopted by some of the previous researchers who have worked with YRs (e.g. Graham, Simmons & Truscott, 2017; Mitra & Serriere, 2012; Bucknall, 2012) in that the YRs were not involved in the design of our data collection tools. We designed a questionnaire and semi-structured interviews with the aim of giving YRs a rich opportunity to tell us about the full range of feelings they experienced in a safe, friendly and non-judgemental environment. Full details about the participants, the after-school club, our data collection and our analysis are given in the remainder of this section.

Participants

Nine young people (6 females and 3 males) aged 12 years at a rural school in central England attended an after-school 'social science research club' run by the authors and overseen by the school librarian for safeguarding purposes. The librarian knew all pupils well due to her additional role of offering pastoral support. The young people were invited by the librarian to take part in this activity on the basis that they represented a range of abilities and might benefit in various ways from an extra-curricular learning opportunity. Ethics approval for our study was obtained from the authors' institution and informed consent to participate was gained from parents and participants. Two of the boys dropped out around half way through the study (they appeared to lose interest) and for ethical reasons could not be pursued, so the findings are from the remaining six females and one male.

The after-school club

The YRs attended 15 after-school sessions lasting 75 minutes each over 6 months. Before agreeing to take part in the club, the YRs were advised that their research should be community-based (they lived in various villages) and that they would: choose their own research topic, create their own research question, choose their own methods, design their own research tools, collect their own data from participants of their choice, analyse their data, and finally make their own research poster and present it at a YRs' Fair at the authors' institution.

As the session time was limited, face-to-face content focused on introducing the key

features of research (e.g. overall research process and research ethics) and key research terms (e.g. qualitative, quantitative, data, methods, semi structured, questionnaires and Likert scale). The research methods and techniques were consistent with those used by social psychologists. Following each session, the YRs engaged in additional self-directed semi-formal learning at home by using the MyShout! online resource[2] created by the first author. MyShout! has been used effectively by previous cohorts of YRs and includes a variety of structured learning activities that scaffold (Wood, Bruner and Ross, 1976) YRs' understandings of, and progression through, the research process. Each set of activities culminate in a requirement for the YR to make their own decisions about their research (e.g. choose their topic, write their own research question, decide upon their own social science research methods, and design their own data collection tools) and then discuss their decisions during the next face-to-face session (see Kerawalla & Webb, 2014 for a more detailed description of the MyShout! website).

The two researchers did not offer any specific advice to the YRs about the feelings they might experience throughout the research process. The MyShout! website also did not include any teaching or support in this regard. This decision was made for several reasons. First, we did not want to anticipate (guess) what the YRs might experience and how they might feel at different research stages because, given the paucity of previous literature on this topic, our preconceptions would necessarily be based upon our own experiences as adult researchers; young researchers' experiences and feelings might be different to our own. Second, we did not want to alter the YRs' emotional experiences by suggesting that they anticipate specific feelings at specific times. Third, we recognised that the YRs were not a homogenous group: they each had different personalities, skill sets, interests, aspirations, and individualised motivations for carrying out their own research. Individual differences such as these made it unlikely that all YRs would feel the same way during their own, unique, research trajectories. Moreover, a wide range of contextual factors would inevitably impact each YR's research progress and, in turn, affect the ways that the YRs felt at particular times. For example, some YRs might enjoy their data collection experience more than others, depending on ease of access to participants. For these reasons, the YRs were not given any specific guidance about how they might feel while they were carrying out their research. They were, however, offered emotional support when they needed it and/or asked for it. They received support from the researchers, and sometimes each other, during after-school sessions if they found specific tasks elicited negative feelings such as worry or confusion, for example. The researchers were always friendly and approachable and aimed to facilitate a climate of mutual trust. Perhaps most importantly, the school librarian was always available during school hours to discuss any issues and was present in the background during the research sessions.

Five of the YRs worked alone and two worked in a pair. Their research topics were:

- Community care for older people
- Community safety and policing
- Local provision of takeaway meals
- Housing development in rural villages
- Dental health
- The role of local charities

The YRs followed broad guidance that they should interview a key member of their community relevant to their research (e.g. a community carer) about the services they provide and then gather data from the public using either a questionnaire, observations and/or photographs; all YRs decided to create their own questionnaire. The current authors were responsible for ensuring that the YRs' research was ethical and a considerable amount of session time was dedicated to ensuring that the YRs had a good understanding of informed consent, confidentiality and anonymity, and that they were able to put their new understandings into practice. Once their research was complete, the YRs created research posters which were then printed and, two weeks later, these were presented at a YRs' Fair. The YRs were given the posters to take home afterwards.

Data collection tools

We designed a questionnaire with the aim of providing the YRs with an opportunity to

[2]http://www.open.ac.uk/blogs/MyShout/

communicate, in a necessarily limited time, the full range of feelings they experienced during the various stages of conducting their own research. The questionnaires were completed in the week following the YRs' presentation of their posters at the YRs' fair. It was not possible to ask the YRs to complete a questionnaire during each stage of their research because session time was very limited. In order to investigate the YRs' reasons behind their questionnaire responses, we conducted individual semi-structured interviews in the following week, where the YRs were asked to discuss their questionnaire responses in detail. Finally, each YR participated in a semi-structured group interview that took place eight months after they had completed their research so we could elicit their long term reflections on their experiences as Yrs.

Questionnaire completed by the YRs: We wanted our questionnaire to be meaningful to the YRs so we incorporated avatars into the questionnaire response sheet, onto which the YRs could project their feelings. This technique has been used previously by Collins, Devine and Holliman et al. (2015) and we used (with permission) their schematic avatar image. A single question was presented at the top of each page of the questionnaire and four avatars were presented under each question (Figure 1).

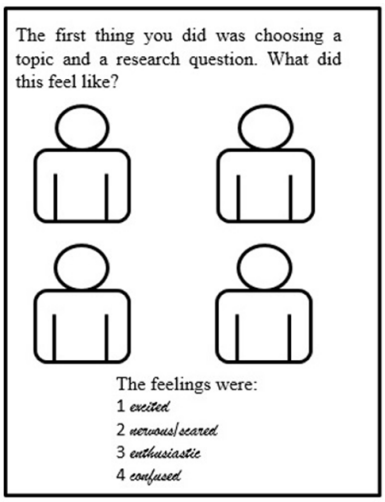

Figure 1. A sample questionnaire item with a YR's responses

The YRs were invited to write one word for each avatar that described how they felt in response to each question (YRs could also draw faces etc. onto the avatars, and all did so, but these were not analysed). There were eight questions – each asked about one stage of the research (Table 1).

Table 1: Questionnaire question about each research stage

Research stage	Question
Start	Remember back to the first face-to-face session, how did it feel at the time?
Topic and research question	The first thing you did was choosing a topic and research question. What did this feel like?
Methods	Then you wrote your interview questions and put together your questionnaire. Please let us know your feelings during this activity.
Ethics	You learnt and thought about research ethics. Please tell us how this felt.
Data collection	Think about data collection. What did it feel like to do an interview and get your questionnaire filled in?
Data analysis	Tell us what it felt like during data analysis and making your graphs etc.
Making a poster	How did it feel when you were making your poster?
Pre-dissemination	How do you feel about going to the University next week to talk to people about your research?

We asked for four words per question as we thought this would be the maximum number of responses achievable within the 20 minutes that were available. To help with this, we provided the YRs with 43 adjectives commonly employed to describe both positive and negative

feelings (e.g. cheerful, gloomy, annoyed, proud, calm, and worried) drawn from Anderson (1968). The YRs were free to use the words provided and/or think of their own, and were advised that there were no wrong or right answers. The YRs started with a practice question about their feelings during the current school day, then completed the main questionnaire quietly and separately.

Semi-structured individual interviews: The individual interviews were conducted the week after the YRs' Fair. Each YR was given a copy of his/her questionnaire and the questionnaire responses were discussed in detail: the YRs were asked an opening question such as 'can you tell us about the words you used to describe how you felt when analysing data?' with follow-up questions to explore their responses in detail e.g. 'why do you think you felt like that?' Each interview was audio-recorded and later transcribed.

Semi-structured group interviews: Eight months after the individual interviews, semi-structured group interviews were conducted with two groups that contained three and four YRs respectively, so that they could discuss their longer-term reflections. Each group interview lasted around 45 minutes and was video recorded to aid the identification, and subsequent transcription, of overlapping speakers. At the start, the YRs were reminded of the questionnaires and individual interviews they had completed earlier, and were provided with two graphs that represented their questionnaire responses (see Figures 2 and 3 below). The first data points on each graph were described by the first author to check the YRs' understanding, then the YRs were asked to discuss the graphs amongst themselves. Next they were asked:

1. Looking back, what were the two most important feelings you experienced?
2. Has doing your own research made any difference to you as a person?
3. How does self-directed research compare with other activities you do outside school?
4. How does self-directed research compare with what you do in science lessons?
5. How did your parents and/or family react when you took your poster home?

The YRs were free to refer to the graphs and talk independently amongst themselves whilst they were discussing the questions in their groups.

Data analysis

We wanted to combine the information from the questionnaires and the interviews to obtain an integrated perspective about the YRs' feelings. The questionnaire answers provided quantitative data about which feelings occurred at each of the stages of the research process. However, this information was limited as it was not clear what the YRs thought were the reasons for these feelings, and how the different feelings could be grouped together. Consequently, a thematic analysis (Braun and Clarke, 2006) was carried out on the individual interviews, which identified how the feelings words in the questionnaires had been used by the YRs. First, all instances of 'feelings words' and the relevant discussion about that word were identified in the interview transcripts. This speech was coded using the qualitative analysis tool Nvivo in terms of 1) the word, 2) what it was being used to describe and 3) the research stage being discussed (e.g. 'nervous + description + preparing poster'). Next, based on how the words had been used to describe feelings, the codes were grouped into seven themes and fifteen subthemes. The themes and subthemes were each labelled to capture their common features. In general, the themes provided information about the types of feelings experienced by the YRs (e.g. worry) and the subthemes provide information about why the YRs had a specific feeling. The codes and themes were then discussed with an independent researcher; disagreements were minimal and were discussed until full agreement was reached.

Following this, the number of YRs who had used the word/s in their questionnaire answers, within each theme, across each research stage, was counted. This meant that we could quantify the frequency of the YRs' feelings and map how they changed over time. Finally, the group interviews were subject to a separate thematic analysis (Braun and Clarke, 2006). Our findings are presented below.

Results

The findings below are presented in four sub-sections which are related to each of the

research questions.

1. YRs' feelings whilst carrying out social science research, and their explanations for these feelings.

Negative feelings

The thematic analysis of the individual interviews identified four themes which described the YRs' negative feelings and experiences: worry, uncertainty, tiredness and disenchantment. These themes and their associated subthemes are outlined below, alongside representative quotes from the YRs which explain how, why and when they experienced specific feelings. Words in italics are those used in questionnaire responses.

Worry: Four subthemes were identified: fear of the unknown, interacting with people, getting everything done, and getting things wrong. Fear of the unknown was described by YRs in terms of feeling 'really *nervous* [at the start] because I didn't know what to expect', and 'I felt *nervous* [about the poster event] because I've never been to the University before'. YRs also worried about interacting with new people. One described how 'I'm not very confident. I don't like talking to people so [the forthcoming poster event] is kind of *scary*', and another reported feeling worried during data collection because she was '*nervous* about the interview because I was sitting in front of two policemen and they're scary'. Another reason for worry was getting everything done e.g. 'you're *stressed* because you've got all these questionnaires to get filled in. If you don't get enough filled in you won't have a wide variety of information'. All the YRs engaged in several after-school activities, sometimes every day, so time was an issue for many of them as described by a YR who said that 'I was *stressed* and *gloomy* about juggling my research and [the school drama production]. I nearly quit [during data collection]'. Finally, worry was associated also with wanting to avoid doing anything wrong: 'I was *scared* because, like, you don't want to mess up [data collection] and do something wrong'.

Uncertainty: Our analysis identified two subthemes: encountering new research practices and encountering new concepts. The high uncertainty at the start of the project was described by a YR who said that she was '*unsure* cos I didn't know what I was going to do'. Several YRs expressed uncertainty when they encountered research ethics e.g. 'I didn't get ethics at first. I was *confused* and felt *stupid*, like I was really *dumb*. But I get it now'. It is worth noting that research ethics were complicated: for example, the YRs had to ask non-participant line managers (e.g. a police sergeant) to agree that participant employees (e.g. policemen) could be interviewed, and they had to gain informed consent from both line managers and employees for anonymised descriptions of role to be disclosed on the research posters.

Tiredness: (No subthemes). YRs' explanations for their tiredness mainly describe the mental effort required when engaging with research activities (e.g. data analysis). One YR described how 'it was *tiring* cos you had the questionnaires and you had to do the tallies. I had to go from page to page and then double check it all. You had to really concentrate'.

Disenchantment: (No subthemes). These feelings were explained mainly in terms of the need to repeat an activity, such as when 'it was quite *frustrating* cos we had to do [our data input] twice to get our graphs right' or when '[questionnaire design] made me get quite *annoyed* because I drafted about ten questions to start with and gave out a questionnaire with only eight. Not all my original questions related to my research question. I'm used to doing things only once'.

Two YRs did not use the word 'tired' in their questionnaire. Interestingly, the same two YRs also did not use any words associated with feeling disenchanted. It is notable that one of these YRs talked about how she adopted an approach that involved purposefully 'keeping calm and doing one thing at a time' and the other was consistently delighted to be taking part in 'such an amazing opportunity'. These YRs were no less worried and uncertain than their peers but they were able to avoid feeling disenchanted or tired.

Positive feelings

The thematic analysis identified three themes associated with positive feelings experienced by the YRs: motivation, mastery and achievement. These themes were subcategorised into several subthemes as outlined next.

Motivation: Our analysis identified three subthemes of the theme motivation: having new experiences, finding out others' opinions, and moving through research stages. New experiences were described by the YRs as occurring when'I felt *enthusiastic* because it was a

new experience' and when 'on the first day I was *curious* to find out what we were going to be doing'. Some YRs felt motivated during the new experience of creating their questionnaires, such as those who described how 'I like answering questionnaires so I thought it would be *exciting* to make one'. Another recounted how she was looking forward to the new experience of presenting a research poster for the first time: 'I was *excited* to see what would happen and what people would ask me'. Data Analysis gave rise to feelings associated with finding out others' opinions in five of the seven YRs. This was explained by YRs as due to feeling '*interested* in what [my participants] were going to say' and "*interested* because [data from] adults surprise you a lot. You get to know more opinions'. Similarly, another YR said that: 'I was *excited*. It was really cool to see what people had put [on their questionnaires]'. YRs also reported being motivated when they felt that they were moving through the various research stages. One described how 'I was *excited* because [the research question] was a first step' and another said that 'doing a questionnaire was one of the key elements of the research. I was *excited* I'd got that far'. It seems that the YRs had a good understanding of research process and of how the completion of one stage meant they were nearing their goal: 'I was *excited* [when analysing my data] as I was nearly doing my poster'.

Mastery: Two subthemes were identified as describing the mastery theme: personal competence and agency. The feelings associated with the sub-theme of personal competence were varied and ranged from feeling '*clever* cos I was using content analysis', '*confident* because I'd done my interview, done my questionnaire and was, like, doing it', '*unafraid*. I felt as if I could conquer Everest because [ethics] was something that I actually understood', to feeling '*happy* [about making my poster] as I had made some in Maths [lessons] before', and 'I felt like *I knew what I was doing as* you'd shown us what to do'. The feeling associated with the sub-theme of 'agency' was one of being in control, as described by a YR who said 'I felt exactly *in control* because it was like all of what I'd done coming together into one [poster]. I was *in control* of what it looked like and what it said'.

Achievement: We identified three subthemes: signs of progression, personal accomplishment and high-level working. Signs of progression were described as feeling '*satisfied* cos it was all going so well at that point [questionnaire design]' and '*proud* because I'd started making my poster and it looked OK'. Feelings associated with a sense of personal accomplishment were experienced by YRs who thought they had completed a task well. YRs described this in terms of feeling '*satisfied* because at the end I'd produced a questionnaire', '*pleased* when I'd done [my interview] because I hadn't messed it up, I'd got the results I wanted and it had answered a lot of the questions' and '*proud* that I was doing this'. YRs reported feelings associated with achievement when they thought that the research they were carrying out was at a high level. This was explained by one YR who said that: 'When I got [my completed questionnaires] back I felt *proud* because I'd spent a long time doing it and it was like a proper questionnaire'. Another said that 'I was *proud* [about going to the University]. I'm getting a chance to go there and I'm not even supposed to go to a university yet'.

2. Extent and frequency of the feelings reported by the YRs

As discussed above, our thematic analysis identified seven themes which describe the feelings and experiences reported by the YRs. The number of times the feelings words were used by the YRs in their questionnaire responses is given in Table 2.

Table 2. Themes, words relevant to each theme, and the frequency of the words

Themes	**Words in the questionnaire responses attributed to each theme** (words in brackets were not on the word list provided)	**Frequency of words used in the questionnaire responses**
Motivation	interested, curious, excited, enthusiastic, (determined)	46
Mastery	confident, unafraid, know what I'm doing, in control, calm, chilled, happy, clever, (sure)	34
Achievement	proud, pleased, satisfied, fulfilled, listened to	29
		Total = 109
Worry	stressed, nervous/scared, (gloomy)	33
Uncertainty	confused, unsure, stupid, (overwhelmed), (puzzled), (dumb)	21
Disenchantment	frustrated, bored, annoyed, uninterested, (sad)	13
Tiredness	tired	10
		Total = 77

Table 2 shows that the YRs used more positive words (n=109) than negative words (n=77) to describe their feelings in their questionnaire responses, which suggests that overall the YRs' experiences were more positive than negative (note that some YRs did not give four responses to each question). The most frequently used words relate to the theme of motivation (e.g. excitement and enthusiasm) and appeared on 46 occasions. There were slightly fewer words associated with mastery (e.g. confident and in control: 34 occasions), achievement (e.g. proud and satisfied; 29 occasions) and worry (e.g. stress and nervous/scared; 33 occasions).There were even fewer words associated with the theme of uncertainty (21), and the most infrequently used words described disenchantment (13) and tiredness (10). These findings confirm that the YRs experienced a range of both positive and negative feelings while carrying out their research, and that they identified more positive feelings than negative feelings.

3. How the YRs' feelings changed over time

The occurrence of the words related to the themes in each research stage was plotted so we could understand how the YRs' feelings changed over time (Figure 2). Note that if a YR used more than one feelings word associated with the same theme within a single research stage (e.g. interested *and* excited at the start), this was counted only once (e.g. as being one occurrence of the 'motivation' theme at the start).

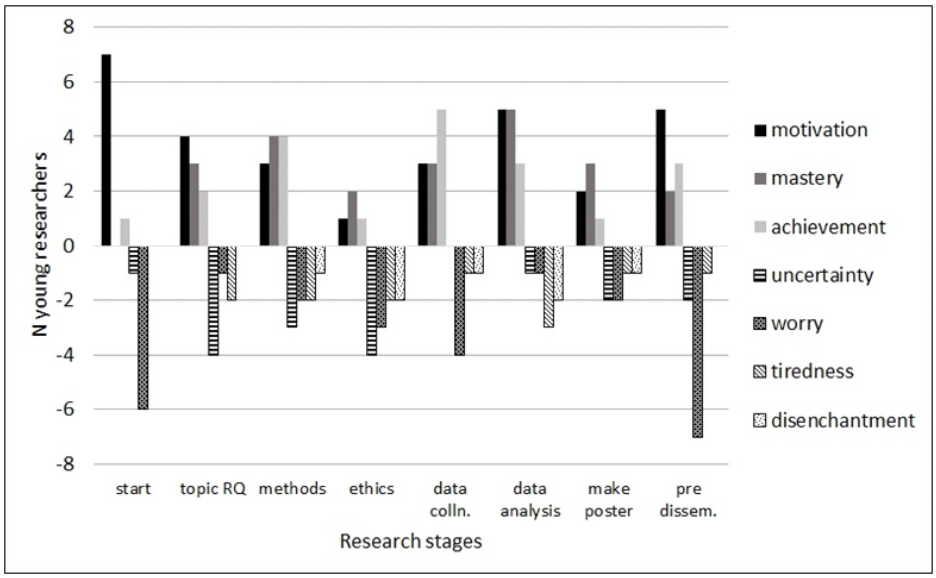

Figure 2. The number of YRs whose feelings were categorised as representative of each theme at each research stage (themes that represent negative feelings appear as minus numbers)

Figure 2 indicates that 'worry' was experienced at all research stages. As might be expected, worry was particularly high at the Start and Pre-Dissemination. Similarly, feelings of 'uncertainty' were at their highest (n=4) during the Topic and Ethics stages of research and low or non-existent during Data Collection and Data Analysis (Figure 2). The high uncertainty at the start of the project appears to have been because YRs were unsure about the focus of their research, and the ideas associated with ethics. Levels of 'tiredness' and 'disenchantment' were relatively low (Figure 2). Tiredness was experienced on various occasions from the Methods stage onwards (it is worth noting that the sessions were held at the end of the school day). For some YRs, feelings of disenchantment were sometimes reported from the Methods to Making Poster stages (Figure 2). These feelings were explained mainly in terms of the need to repeat an activity, such as during the development of questionnaire items or re-entering data to ensure accuracy; some YRs found that these experiences resulted in feelings of frustration and annoyance (Table 2).

In terms of positive feelings, words which related to 'motivation' were present at all stages of the research process and were particularly high at the Start (Figure 2). This in part appears to reflect the initial excitement of starting out on a new experience, and this excitement was also present when other new experiences were encountered such as making a questionnaire for the first time. Data Analysis also gave rise to feelings associated with motivation in five of the seven YRs (Figure 2) and this appears to have been due to the interest in analysing the opinions of the research participants. Unsurprisingly, the YRs did not report any feelings associated with 'mastery' at the Start but these feelings were reported at all the other stages (Figure 2). Finally, the YRs reported feelings associated with 'achievement' at all research stages (Figure 2). All these findings suggest that, most of the time, the YRs relished the responsibility of leading their research even though it also caused them some negative feelings.

Figure 2 also shows how feelings were often *mixed* and *diverse*. An example of *mixed* feelings (i.e. both positive and negative feelings at the same stage) is when all seven YRs were motivated at the start, but six of them also felt worried. An example of *diverse* positive feelings (i.e. when more than one positive theme occurs per stage) was when feelings associated with both mastery and achievement were experienced by most YRs during the design of data collection tools and during data analysis.

Figure 3 shows more clearly the peaks and troughs that the YRs experienced (i.e. each data point is a sum of the bars representing each research stage in Figure 2).

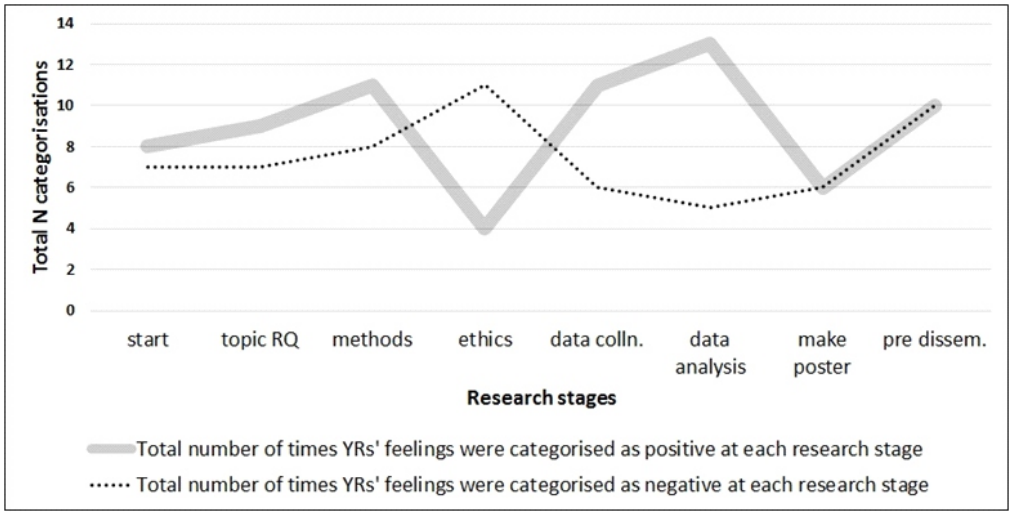

Figure 3. Total number of times YRs' feelings were categorised as positive and negative at each research stage

Figure 3 illustrates clearly how feelings were always mixed; at no time did the YRs experience only positive feelings or only negative feelings. The total positive and the total negative plot lines in Figure 3 diverge slightly from 'start' to 'methods', indicating that the range of feelings were increasing during this time. At 'ethics' the data points indicate a sudden drop in positive feelings and simultaneous increase in negative feelings, indicating that feelings became more divergent with more negative and fewer positive themes being referred to when this topic was being considered. In the interviews a number of YRs reported finding this topic difficult, while also appreciating its importance. Once data collection and analysis had started, feelings were still mixed but there was an increase in positive feelings and a decrease in negative feelings, suggesting that these research stages were positive overall for most YRs. However, there was a reduction in positive feelings when the YRs were making a poster, which in interviews was described as a difficult activity. This was followed by an increase in reference to positive and negative feelings at pre-dissemination when there was excitement at the prospect of presenting a poster, but also some concerns about the event.

The YRs' long term reflections on their experiences

Motivation and Worry: During the group interviews the YRs unanimously agreed that the two most important feelings were those associated with motivation and worry (which broadly supports the findings in Table 2). One group explained the source of motivation as being 'like when you go exploring' and embark on 'a journey into the unknown' when 'you don't know where you're going to end up'. They described this journey as being both exciting and worrying. Whilst looking at Figures 2 and 3, both groups remarked on the diversity of feelings and their mixed nature, and broadly agreed that 'you kinda go down [below the X axis] into the worry but then the motivation pulls you back out'. One YR suggested that 'if you get a good balance of worry and motivation you would sit just above this [X axis]. You would have a good level of motivation but then you'd also have worry and nerves'. This comment supports the data in Table 2 which shows how the YRs' experience of self-directed research was more positive than negative and suggests that their motivation could partly be related to their 'worries'.

'Proper' thinking and deeper learning: All YRs agreed during the group interviews that self-directed research is very different to other out-of-school activities they participate in such as Girl Guides, dance and sport. They said that self-directed research is different because it requires a deeper level of thinking: 'you had to think, like proper think, about what you were doing'. They said they now felt more confident and critical of unsubstantiated facts such as those presented in advertisements.

The YRs agreed unanimously that their self-directed research experience was also very different to what they do in school science lessons. They acknowledged the difference between social science and the natural sciences they study at school but, related to the point above about the opportunity to engage in deep learning and thinking, they described how 'in a science lesson we do a whole experiment in an hour or two. With this [self-directed research]

we spent a whole *hour* about how to refine a research question!' They also talked about the fact that 'in science lessons it's something that has already been discovered, it's set out for us, they already know the answer to it. But with this [self-directed research] you do it yourself and you find out on your own what no one else has done. It's original'. One YR concluded that, in comparison, 'the national curriculum is boring'.

The YRs also discussed other benefits such as learning new things, transfer of knowledge to lessons, becoming more critical, developing more confidence, and looking at ethics from a new perspective. Also they reported the parental delight in seeing the finished product. Furthermore, the young people valued all these outcomes to the extent that they were keen to set up a mentoring scheme for the next year group. Significantly, they described how they had applied what they learned as YRs to other lessons and were able to give examples of helping other students in their class with the complexities of ethics and questionnaire design.

Discussion

We offer the first systematic and detailed study designed specifically to investigate the wide range of negative and positive feelings experienced by YRs when they are conducting their own social science research in an after-school club. Our findings identify the negative and positive feelings experienced by the YRs, present the YRs' perspectives on the circumstances that gave rise these feelings, and explore the YRs' longer-term perspectives on the value of the experience of carrying out their own social science research. The current study supports and significantly extends previous research which has reported briefly that some YRs describe positive feelings such as enjoyment and confidence (e.g. Michail & Kellett, 2015; Mitra & Serriere, 2012; Burton, Smith & Woods, 2010; Robson, Porter, Hampshire & Bourdillon 2009; Cox & Robinson-Pant, 2008), and negative feelings such as worry and nervousness (e.g. Graham, Simmons & Truscott, 2017; Bucknall, 2012). The current in-depth investigation has elicited more detail about the wide range of feelings experienced by YRs, has quantified the extent to which the various feelings are experienced, mapped the occurrence of feelings across research stages, presented data suggesting that feelings are mixed and diverse, and has investigated YRs' perspectives on why they felt a particular way during particular stages of their research. To the best of our knowledge this has not been done before.

The data analysis of the questionnaires and individual interviews that were carried out in the current study identified a range of positive and negative feelings which could be grouped into the positive themes of motivation, mastery and achievement, and the negative themes of worry, uncertainty, tiredness and disenchantment. Overall, fifty-nine per cent of the words used in the questionnaire responses could be categorised as belonging to positive themes showing that, although the positive descriptors were in the majority, there were still many negative descriptors used. Usually there were mixed, and diverse feelings reported at each stage of the research process, with both positive and negative words being used by YRs at a particular stage in the research process. It is also apparent that these feelings changed with the progress of the research. For example, at the start of their research the themes of motivation and worry were reported by most Yrs. However, these diminished as their research got underway, with a broader range of experiences being reported. Also, once data collection had started, the feelings became more positive overall until new concerns emerged with the challenges of making a poster. Thus, the experiences of carrying out self-directed research resulted in a complex set of feelings. Analysis of group interviews eight months later revealed that the YRs thought that motivation and worry were the most important themes and that feeling motivated helped during times of worry. Also, they said that overall, they valued their research experience as it offered new opportunities for thinking in depth and carrying out original research, both of which were not always possible in the classroom.

We believe that focusing on the inter-relationships between the positive and negative themes provides useful insights into the nature of the YRs' self-directed research experiences. Interestingly, the three Motivation subthemes were almost mirror images of three of the Worry subthemes. The positive feelings associated with 'having new experiences' (e.g. feeling curious to find out what we would be doing), contrasted with the less positive 'fear of the unknown'. The motivating effects of 'finding out about others' opinions' (e.g. being interested in what the participants would say) contrasted with concerns about 'interacting with new people'. While, 'progressing through the stages' (e.g. I was excited I had got that far),

contrasted with worries about 'getting things done'. This symmetry suggests that positive and negative feelings were opposite sides of the same coin, and it is possible that worries were an integral part of the motivation to work on the project.

In a similar vein, the second most commonly used words in the questionnaire were those within the Mastery theme and, again, there seemed to be a relationship between the two positive Mastery subthemes and several of the negative subthemes. Personal competence (e.g. I felt clever) is the other side of the coin to the negative subthemes that describe the worry associated with 'getting things wrong' and 'failing to grasp new concepts'. The other positive subtheme of Agency (e.g. I felt exactly in control) contrasts with the negative theme of Confusion and its subthemes of 'concern about encountering new research practices' and 'failing to grasp new concepts'.

The third most commonly used group of positive words concerned the Achievement theme. One of the subthemes of Achievement was 'work is progressing well' (e.g. I felt satisfied all was going well at that point) and this compares to the negative subtheme of worry about 'getting everything done'. The other positive subtheme of 'personal accomplishment' (e.g. satisfaction at producing a questionnaire), seems to be related to the same negative subtheme of worry about 'getting everything done'. These relationships again suggest that the negative and positive experiences were linked to one another. The positive themes and subthemes appear to be less closely and directly linked to the two least frequently identified negative themes of Tiredness and Disenchantment. Here there could be links between motivation (e.g. excitement, interest) and tiredness where there is low energy, and links between the themes of motivation and achievement in relation to disenchantment.

It is important to acknowledge that two boys (who were working as a pair) dropped out of the current study once they had collected their data. For ethical reasons we could not follow-up these young people, but their decision to discontinue their research suggests that their overall experience was negative. Indeed, one of them failed to attend several sessions before they both finally ended their involvement. One of the other YRs, who did finish his research, nearly gave up when he found it increasingly difficult to manage all his after-school activities. These examples emphasise that self-directed research is not always a positive experience. Our other findings suggest that there are a number of negative feelings which could contribute to a decision to end a project early and that having a positive experience as a YR is dependent on a range of factors including those that are external to the immediate research task.

These findings have implications for the nature of future support and reassurance required by, and made available to, YRs during the conduct of their self-directed research, and we hope our findings provide a first step in the beginning of this process. In terms of negative feelings, to some extent these could be reduced by, for example, more detail at the beginning about the research process. However, a balance needs to be struck between overwhelming YRs with too much information too early, and causing uncertainty by telling them too little. We suspect also that the independence, responsibility and autonomy given to the YRs had the consequence of producing challenges which needed to be overcome (see also Graham, Simmons & Truscott, 2017). Challenges were a cause of excitement and motivation as well as negative feelings such as worry, but when a challenge was overcome there was pleasure and satisfaction. The wide range of feelings experienced by YRs in the current study, and the fluctuating intensity of these feelings, suggests that reassurance by adults is crucial and could be just as important as, or even more important than, the more commonly discussed forms of support which concern the provision of information.

It is important to consider the possibility that negative feelings are an inherent part of any research and learning process where an individual is given responsibility for completing a project. This idea was voiced in some of the discussions during the group interviews where the YRs suggested that the negative feelings provided a motivation to complete the research: 'if you get a good balance of worry and motivation you would just sit above this (the division between negative and positive feelings). You would have a good level of motivation but then you'd also have worry and nerves'. Although the negative feelings might be regarded as problematic by some, we would see this as an inevitable part of giving responsibilities to the young people and that with support they can be contained. The balance between motivation and worry might be difficult to achieve for those that support the learning of YRs but is one which is likely to be critical to the way the project is viewed and, perhaps more importantly, critical to the way in which the YRs view themselves.

Our research raises interesting questions about whether the feelings experienced when learning to be a YR are similar to the feelings experienced by young people when they are engaged in other challenging learning activities that require similarly high levels of autonomy, responsibility and commitment, such as learning how to play a musical instrument or learning how to be a rock climber. None of the feelings reported in this study are new; they are experienced by people of all ages across a range of situations. However, importantly, YRs are engaged in a task which is not usually associated with childhood and which is very likely to be unfamiliar. Indeed, many of the initiatives with YRs, including the one reported here, begin with a session that addresses the question: 'what is social research?' (e.g. Kerawalla & Webb, 2014; Kellett, 2005) as it is a concept unfamiliar to most young people. This, together with the adult-led nature of most, if not all, YR initiatives, means there is a moral imperative for adult researchers to investigate YRs' feelings in order to understand whether the activity is appropriate for, and enjoyed by, young people. Thus, it is possible that the feelings experienced by young researchers share similarities with the feelings experienced by young people who are engaged in a number of other challenging activities. An issue for future research is to better understand the relationships between different activity types and the feelings they elicit.

Given that the feelings of YRs could be similar to those experienced during other activities which provoke high levels of engagement and achievement, it is useful also to reflect on the way that the feelings experienced by YRs might differ from those that occur during more typical classroom-based activities. In the United Kingdom it would be extremely rare for a single topic to occupy such an extended period-of-time in the curriculum or for such a high level of ownership and responsibility to be given to pupils. It would be interesting to investigate whether the ownership that the young researchers took of their project resulted in a higher level of both positive and negative emotions than would be seen in more usual classroom activities where ownership is often at a much lower level. Questions also arise about whether young people should be given a greater ownership of the education they receive.

Findings from the group interviews, conducted 8 months after the YRs had completed their research, suggest that, compared to science lessons and other out-of-school activities, doing their own research involved YRs in thinking about issues in greater depth ('you had to think, proper think') and gave them an opportunity to conduct novel research that gave rise to new information that was not already known. These findings also point to the potential significance of after-school activities that involve school, home and the wider community. Given the constraints of the English national curriculum, the YRs would not have been able to carry out this research in school time, but without the structure and support of the school (and importantly from the school librarian), they were very unlikely to have initiated or carried out the projects by themselves. In the space provided in an after-school club they obtained social support from the school librarian, ourselves, other YRs and their families. The flexibility of this space, when combined with support, opened up new opportunities for the YRs, and they reported this was a special experience for them that differed from typical classroom activities. Furthermore, as our research indicates, this space can provide the opportunity for innovative activities; something also discussed in, for example, the Schome Project - 'not school, not home, schome' (Schome Project, 2016). Our research also supports the argument that the UK education system needs to provide more opportunity for young people to develop the skills required to carry out autonomous, self-directed projects within classroom settings to equip them with employability skills and a better understanding of what possible future careers might involve (Institute of Directors 2016).

Together these findings indicate that the research experience of young people involves a diverse and complex set of experiences and feelings across a range of places and social interactions. The findings might also inform future investigations into the feelings experienced by adult researchers because the YRs' experiences were similar to the 'emotional roller coaster ride' reported in Cotterall (2013), of ups and downs involving positive and negative feelings. However, our findings suggest that the roller coaster ride is less likely to be experienced as a simple rising and dipping line (or roller-coaster track) with a single feeling changing over time (e.g. happy then sad); it is more likely to be experienced as a complicated tangle of mixed and diverse, inter-related feelings at each stage of the research. The YRs in this study painted a picture of rich, varied and complex feelings and experiences which are likely to be similar in some ways to those experienced by adult social science researchers;

although, further investigations are needed into the experiences of adult researchers given the multitude of differences between them and young people. Consequently, our findings can inform future investigations into the feelings, experiences, and support needs of YRs undertaking their own research, and those experienced by adult researchers at various stages of their careers.

Conclusions

Whilst engagement in self-directed social science research can greatly benefit young people in several ways (e.g. Graham, Simmons & Truscott, 2017; Mitra & Serriere, 2012; Bucknall, 2012; Cheminais, 2012; Kellett, 2005; Kerawalla, 2014; Kerawalla & Webb, 2014; Kerawalla & Messer, 2017), our research suggests that it is not unproblematic. Young researchers experience a range of negative feelings involving worry, uncertainty, tiredness, and disenchantment. Moreover, 'worry' was the most frequent descriptor used on the questionnaire and was one of the two words the YRs thought best described the research process after a gap of 8 months. Thus, an important message from these findings is that empowering young people to carry out their own research appears likely to produce a range of negative feelings that may differ from those experienced in response to more structured experiences that are overseen at all times by an adult. This is not to say that these feelings were unmanageable or out of control, rather the general tenor of the conversations were that the feelings were part of the complex responses to the situation. Furthermore, it is of relevance that the YRs believed they had gained much from, and greatly valued, their experience in a number of different ways despite the presence of negative feelings. Future research might explore the longer-term effects of the feelings produced by engagement in self-directed research, including a consideration of whether these experiences have an impact on career choices.

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