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Why do some students opt out of fieldwork? Using expectancy-value theory to explore the hidden voices of non-participants

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Fieldwork is an important part of higher education programmes in geography, geology, environmental sciences and biosciences because it offers opportunities to enhance graduate employability alongside pedagogical and social benefits. However, not all students choose to participate in fieldwork and the reasons that some opt out are unknown. We used the expectancy-value theory of motivation to investigate why some students opt out of fieldwork. Data from six universities showed that students who opted out held lower fieldwork motivation than those who opted in. There was no effect of gender on fieldwork motivation but there was an effect of previous experience whereby students with previous fieldwork experience had higher motivation than those without. The reasons that students opted out related to pursuing alternative opportunities, barriers to their participation or a disinterest in fieldwork. Our findings suggest that alternative opportunities should offer similar pedagogical and professional and social development benefits to fieldwork and that further fieldwork opportunities are included in programmes to cater for students who have high fieldwork motivation but encounter barriers that prevent them from participating in field courses. Furthermore, programme design should eliminate structural barriers to fieldwork participation.

Keywords: fieldwork; motivation; employability; field trips; expectancy-value theory

Importance and benefits of fieldwork

Fieldwork is a signature pedagogy of degree courses in geography, geology, environmental science and the biosciences and as such is thought to play a significant role in the personal, professional and academic development of students (Fleischner et al., 2017; Mauchline et al., 2013; Scott et al., 2012). Indeed, in the UK, the inclusion of fieldwork in degree programmes in these subjects is required as it provides opportunities for students to develop subject-specific skills that are expected of graduates from these programmes (QAA, 2019a, 2019b, 2019c). Fieldwork has also been shown to help students with knowledge recall (Scott et al., 2012) and increase attainment in later examinations (Easton & Gilburn, 2012). One way in which fieldwork is thought to enhance learning is by providing an opportunity for students to test and deepen their understandings of concepts studied in class through first-hand experience (Dykas & Valentino, 2016; Fleischner et al., 2017). In this way, fieldwork represents an experiential learning opportunity (Scott et al., 2012) and the cycle of experiencing, reflecting, generalising and testing (Healey & Jenkins, 2000) requires students to analyse and evaluate their findings thus using the higher-order cognitive skills characteristic of deeper learning (Hill & Woodland, 2002). Furthermore, Boyle et al. (2007) showed that fieldwork elicits largely positive affective responses, which are also thought to facilitate deeper learning. However, not all fieldwork experiences are equal and Anđelković et al. (2017) suggest that look-and-see fieldwork elicits different responses from investigative fieldwork where students actively participate in the collection, processing and analysis of data. Indeed, Scott et al. (2019) demonstrated differing affective and conative (self-reported motivation) responses at different times during a field course dependent on the design of the learning activities. The link between positive affect and motivation and deeper learning made by Boyle et al. (2007) and Stokes and Boyle (2009) indicates that factors such as the design of fieldwork and how enjoyable it is for students may influence learning outcomes. Indeed,

Hodson (2005) highlights that the intention and design of practical work can influence its efficacy for meeting intended learning outcomes.

Among the numerous advantages of learning through fieldwork is the opportunity to develop technical and transferable skills and, as a result, to potentially increase graduate employability (Peasland et al., 2019; Wall & Speake, 2012). For example, Wall and Speake (2012) found that geography students identified many skills developed through fieldwork, and we have previously shown that well-designed fieldwork allowed bioscience students to develop a wide range of skills (Peasland et al., 2019). Our study also showed that increasing student autonomy allowed the development of more transferable skills than less-autonomous, staff-led, fieldwork (Peasland et al., 2019). Transferable skills are those that are useful in many professions and so fieldwork offers opportunities for all students to enhance their employability regardless of their future career plans. Given the opportunity to reflect on their fieldwork experience, students identified many transferable skills, which Wakeham (2016) suggests are valued highly by employers but can be difficult for students to identify without specific opportunities to help them recognise these skills as the students in our research received (Peasland et al., 2019). Fieldwork is also reported to provide social development benefits through strengthened relationships amongst the student body and between students and staff (Stokes & Boyle, 2009).

Despite the educational, employability and social benefits of learning through fieldwork, not all students choose to participate and unless there are opportunities elsewhere in their programmes for students to access similar benefits those who opt out miss an important opportunity for the development of employability-enhancing skills.

We acknowledge that well-designed learning activities using other pedagogies such as workshops or laboratory courses might also offer similar benefits, but we have chosen to focus on fieldwork for the present study as fieldwork has been shown to have the pedagogical

and professional and social development benefits discussed above and is a signature pedagogy of our disciplines (France & Haigh, 2018; Scott et al., 2019). However, the existing literature has focussed on the experiences of students participating in fieldwork (e.g. Boyle et al., 2007; Scott et al., 2019; Stokes et al., 2011) and the experiences of those who opt out are missing, therefore, the reasons that some students opt out are unknown. We focus on higher education as whilst there is much discussion about fieldwork provision during compulsory schooling (e.g. Dillon et al., 2006; Lambert & Reiss, 2014) the fieldwork that it offered during compulsory education is normally provided to all students (Lambert & Reiss, 2014). However, the flexibility of higher education courses that allow students to choose units of study that best suit their interests and ambitions means that the opportunity to opt out of fieldwork is more prevalent at this level of study.

We used the expectancy-value theory of motivation (EVT) to underpin our investigation into students' fieldwork participation choices as EVT has been shown to explain achievement-related choices in education domains other than fieldwork (e.g. Eccles, 2005; Guo et al., 2015; Musu-Gillette et al., 2015). The basic premise of EVT is that people are motivated to participate in opportunities that they expect to succeed in and of which they value the outcome (Eccles & Wigfield, 2002).

Drivers of fieldwork engagement

Many authors have discussed potential drivers of engagement in fieldwork and have investigated students' perceptions of fieldwork (e.g. Goulder et al., 2012; Scott et al., 2012; Stokes & Boyle, 2009) in the context of factors such as previous fieldwork experiences, gender, physical challenge, fieldwork location and financial costs. For example, Boyle et al. (2007) and Scott et al. (2012) found that previous fieldwork experiences did not influence students' future perceptions of fieldwork and Dunphy and Spellman (2009) and Goulder et al.

(2012) found that male and female students had equally positive views of fieldwork suggesting that gender does not affect engagement. Fieldwork can be physically challenging, which could affect students' desire to participate if they question their personal fitness, although Boyle et al. (2007) found that while some students they surveyed were concerned about physical challenge prior to fieldwork, the experience largely mitigated these concerns. The location of a field course could affect students' desire to participate positively if the course is held at an attractive destination or negatively if the students do not wish to visit the location (Scott et al., 2019). Finally, the financial cost of fieldwork can affect students' participation choices (Scott et al., 2019). Course fees to which students are normally expected to contribute (Wilson et al., 2016) are the most obvious cost. However, financial costs may also include loss of earnings from part time jobs (Scott et al., 2012), the need to purchase additional clothing or equipment, vaccinations for safer travel to some locations or requirements to hold qualifications that have costly training (e.g. scuba diving certificates). All of these factors may influence students' decisions regarding their fieldwork participation.

Theoretical framework

Many investigations of student's perceptions of fieldwork or the drivers of engagement with fieldwork suggest that most students find it enjoyable and valuable (e.g. Dunphy & Spellman, 2009; Maguire, 1998). However, Dunphy and Spellman (2009) and Goulder et al. (2012) found that some students held negative opinions of fieldwork and did not recognise its value for their learning and development. Eccles (2005) and Wu and Fan (2016) suggest that students will engage with tasks that they consider to be valuable and think they are capable of succeeding in. The greater a student's perception of the likelihood of success in, and the greater the value of, a task the more motivated students will be to engage in the activity (Wu & Fan, 2016). This is the basic premise of the expectancy-value theory of motivation.

Expectancy-value theory (EVT) differs from other motivation theories more commonly referred to in pedagogical studies because it focuses on both expectancies for success and task value (Eccles & Wigfield, 2002). In comparison, the commonly used self-efficacy theory focuses only on expectancies for success at a task, whilst self-determination theory, interest and goal theories all focus on the reasons for engaging in a task (Eccles & Wigfield, 2002). The virtue of considering expectancy and value simultaneously is highlighted by Eccles and Wigfield (2002) who ask why, even if expectancies for success are high, would one participate in an activity if the potential outcome is not valuable?

In the context of EVT, expectancy is assessed by establishing an individual's perception of their competence within the task or subject in question (Wigfield & Eccles, 2000), whilst value comprises four elements: attainment value, intrinsic value, utility value and cost (Eccles & Wigfield, 2002). Attainment value concerns the personal importance of success in a task and relates particularly to the importance of success to one's identity. Intrinsic value relates to how enjoyable or interesting a task is and utility value to how it will contribute to achieving goals. A high utility value could, therefore, motivate one to participate in a task even if the task itself is not considered very interesting. When applied to fieldwork, therefore, students who do not find fieldwork interesting may still be motivated to participate if they recognise the benefits for enhancing their employability. Finally, cost is defined as the negative consequences of participating in a task (Eccles & Wigfield, 2002). Potential costs of participating in fieldwork include lost time for students undertaking paid work, financial cost of the field course or pre-trip anxiety (Boyle et al., 2007; Kent et al., 1997; Maguire, 1998). Recent research focusing on the cost dimension of value has identified three categories of cost (e.g. Flake et al., 2015; Perez et al., 2019; Rosenzweig et al., 2020). These are perceived effort cost, which is an assessment of whether the effort required to well

in a task is worthwhile, emotional cost, which relates to any anxiety related with failure in a task and loss of valued alternatives cost, which is an assessment of whether participating in one task is worth any negative implications of opting out of a different task (Flake et al., 2015).

We chose EVT to underpin our investigation because EVT has been shown to explain achievement-related choices in education settings (e.g. Eccles, 2005; Guo et al., 2015; Musu-Gillette et al., 2015). Furthermore, the model acknowledges that expectancies and value judgements are underpinned by factors such as past experiences, cultural stereotypes or gender (Eccles, 2005). Some of these are similar to the drivers of fieldwork engagement, which have previously been investigated as unique factors. Perhaps these factors act collectively to influence students' motivation to participate in fieldwork. Importantly, domain specificity is a key assumption of EVT. That is, that motivation will vary depending upon the domain or task in question (Musu-Gillette et al., 2015). For example, a student could have high motivation for learning in lectures or laboratory investigations and this is independent of their motivation to engage with fieldwork.

Research aims and objectives

To date, the literature discussing students' perceptions of fieldwork has utilised the opinions of those who are participating in or have previously participated in fieldwork. Consequently, the voices of those who opt out of fieldwork are missing and the reasons that students do not participate in fieldwork are unknown. Our work addresses this gap and provides insight into students' decision-making processes when offered the opportunity to attend field courses. To our knowledge, this is the first time the EVT has been used to assess students' fieldwork motivation. Furthermore, we collected data from students attending six UK universities, which provides a broader insight into students' fieldwork perceptions than previous studies

that have utilised a single-institution case study approach (e.g. Goulder et al., 2012; Larsen et al., 2017; Maguire, 1998; Peacock & Bacon, 2018). Scott et al. (2019) highlight the need to understand students' decision-making processes surrounding their fieldwork participation so that this insight can inform fieldwork design. Our specific research questions were:

(1) Do students who opt out of fieldwork have different fieldwork motivation scores from those who opt in?
(2) How can students' choice to opt out of fieldwork be interpreted using expectancy-value theory?

Methods

Sampling and participants

Data were collected from students at UK universities who could participate in an optional field course as part of their degree programme. Universities were recruited using three approaches: First, the authors' existing networks were used and colleagues who lead fieldwork at other institutions were asked to collect data from their students. Second, public appeals for staff who would collect data from their students were made using social media. Third, all staff who agreed to collect data were asked whether they could suggest colleagues at other universities who might be willing to participate in the study.

Six universities supplied data, which yielded 311 student responses of which 79 (25%) opted out of fieldwork. Participation in the research was voluntary and all participants provided informed consent in line with our research ethics approval. In the interests of confidentiality, institutions are referred to using randomly assigned letters and characteristics of field courses using broad categories. For example, field course locations are reported as being in the UK, Europe (EU) or Worldwide (WW) for locations outside of Europe. Most

students (93%, n=288) were studying a bioscience degree and the most common programmes were Biology (n=96) and Zoology (n=105). The remaining 17 students (5%) were all studying Geography. Six students (2%) did not state their degree programme. All students were undergraduates with 28 (9%) in their first year, 152 (49%) in their second year and 125 (40%) in their final year (6 students declined to state their year of study). There were 175 (56%) female respondents, 123 (39%) male respondents, 2 respondents (1%) identified as non-binary and 11 respondents (4%) preferred not to state their gender.

Data collection

Data were collected in two phases. First, the staff member who had agreed to collect data on our behalf was interviewed by the first author. Interviews were conducted by telephone and topics covered included the field course destinations, any financial costs to the students and the field course durations. A summary of this information is shown in Table 1.

[Table 1 near here]

Data from students were collected using a paper-based questionnaire sent to the staff member who had been interviewed and, after completion, returned in a pre-paid envelope. The questionnaire collected demographic information including the respondent's degree programme, current year of study, gender and age. Next, students were asked whether they had undertaken fieldwork previously and whether they had opted out of fieldwork during their undergraduate studies. Open response questions asked why students had opted into or out of fieldwork and what their future career plans were. Finally, students' fieldwork motivation was assessed using our new fieldwork motivation scale.

The fieldwork motivation scale comprised 29 items, which reflected the five components of EVT (scale item examples are shown in Table 2; see supplementary material for the full scale). Each item was a statement worded to reflect conventions established in

previous EVT-based research. For example, Wigfield and Eccles (2000) asked respondents to compare themselves to their peers when assessing expectancy or to compare their interest in the domain in question with other domains of their education when assessing intrinsic value. Similarly, Wu and Fan (2016) include items relating to the personal importance of success in a task when assessing attainment value. The fieldwork education literature provided inspiration for items to assess value, for example, the item 'Seeing things in real life during fieldwork that I have learned about in class helps me understand them' assessed whether students agreed with this reported utility benefit of fieldwork. Additionally, authors have discussed the factors that may act as barriers to engagement, such as, financial cost (Mauchline et al., 2013; Maw et al., 2011) or fieldwork-related anxiety (Boyle et al., 2007; Nairn et al., 2000), which were included in the cost component of value. Participants responded using a five-point Likert scale ranging from 'Strongly agree' to 'Strongly disagree'. Responses were converted to a value between one (negative opinion) and five (positive opinion) and these values were summed to give a fieldwork motivation score (ranging from 29 – low motivation to 145 – high motivation).

The fieldwork motivation scale was tested to assess reliability. The items were distributed to a sample of postgraduate research students who represented a convenient and heterogeneous sample; criteria suggested by Clark and Watson (1995) to be a useful population to assist in scale development. Following the completion of pilot testing, Cronbach's alpha was calculated for each of the subscales individually as this practice is adopted by other researchers using EVT (Durik et al., 2006; Nagengast et al., 2013; Symes & Putwain, 2016; Wu & Fan, 2016). An alpha of 0.7 was used as a benchmark for internal consistency reliability as this is the value DeVellis (2017a, p. 145) describes as "respectable".

[Table 2 near here]

Analysis

Qualitative analysis

Qualitative data were transcribed and anonymised using a randomly assigned identifier (e.g. UNIA01 was given to the first response from University A). We used thematic analysis (Nowell et al., 2017) to organise and analyse the qualitative data and this was underpinned by the pragmatic research paradigm, which as Patton (2015) suggests seeks to find useful, actionable answers to questions. Here, we sought to find useful insights that might inform future fieldwork provision. Thematic analysis was used to code free-text responses to two questions: The reasons that students had given for opting out of fieldwork and the career that students planned to pursue after graduation both of which could provide insights that might be used to inform future fieldwork. We chose thematic analysis as this is a flexible approach (Braun & Clarke, 2006; Nowell et al., 2017) that is, therefore, equally applicable to short-form responses such as those collected here and to long-form qualitative data. Codes were generated inductively from the data as the reasons for opting out of fieldwork have not previously been investigated and this approach allowed us to report reasons identified by students rather than fitting their responses to our pre-conceived ideas as the alternative deductive approach entails. Furthermore, Braun and Clarke (2006) and Nowell et al. (2017) suggest that initial codes should be generated from the data. Where students gave multiple reasons for opting out (n=9), the first reason listed was taken as the primary reason. Codes were recorded on the transcripts using NVivo qualitative analysis software (QSR, 2015) and as new codes were identified, previously coded transcripts were revisited to ensure that all responses were coded accurately and consistently.

Once coding was complete, the codes were collated into themes, which were again generated inductively. There were three broad themes of reasons for opting out of fieldwork: professional development, barriers to participation and disinterest in fieldwork. The codes

could also be considered in themes related to reasons of perceived high cost aligned with two of the three categories of cost identified by Flake et al. (2015) and Rosenzweig et al. (2020). These were loss of valued alternatives cost and emotional cost. The specific codes and themes are shown in Table 3. Ten themes encompassed many careers that students planned to pursue (Table 4). All coding was initially undertaken by EP, but the generation of codes and the collation of codes into themes was undertaken through discussion amongst all authors. Coding accuracy was independently checked by LM using a sample of 10% of all responses (n=34) for the career plan question and 20 responses for the reasons students opted out (26% of those who opted out). The inter-coder reliability was 96%, which exceeds the minimum acceptable reliability of 90% (Miles & Huberman, 1994).

[Tables 3&4 near here]

Quantitative data validation

Confirmatory factor analysis (CFA) was used to test the efficacy of the questionnaire for determining motivation as theorised by EVT. The CFA was conducted using the lavaan package (Rosseel, 2012) in R (R Core Team, 2018). As the Likert data were ordinal, ordered variables were specified, which employs the diagonally weighted least squares estimator and polychoric correlations (Li, 2016; van der Eijk & Rose, 2015). Three indices were used to assess model fit: first, the root mean square of approximation (RMSEA) where <0.082 (for polychoric correlations) is considered acceptable (Guo et al., 2015; van der Eijk & Rose, 2015). Second, the comparative fit index (CFI) and third, the Tucker-Lewis index (TLI) where >0.9 represents acceptable, and >0.95 excellent, fit to the data (Guo et al., 2015; Nagengast et al., 2013). The CFA showed an adequate fit of the data to the EVT model: RMSEA = 0.069, CFI = 0.991, TLI = 0.990.

The internal consistency reliability for each subscale was assessed by calculating Chronbach's Alpha using the psych package (Revelle, 2017). Alpha values range from zero

to one where higher values indicate increased reliability. DeVellis (2017b, p. 145) suggests that a 'respectable' score is >0.70, and indicates that a score between 0.65 and 0.70 would be 'minimally acceptable'. Alpha values for each subscale ranged between 0.68 and 0.90 (Table 5) demonstrating acceptable internal consistency reliability.

[Table 5 near here]

Quantitative analysis

All quantitative analyses were conducted using R (R Core Team, 2018). Responses to the fieldwork motivation scale were transcribed into a Microsoft Excel spreadsheet alongside other variables collected from the questionnaire and staff interviews (Table 6) and the reasons students gave for opting out.

[Table 6 near here]

Linear models were used to compare fieldwork motivation scores (calculated from the 29-item scale) between groups of students based on the categories identified in Table 6 and the themes generated inductively from the qualitative analysis. The inductive themes were used rather than the themes related to conceptions of cost also included in Table 3 for two reasons. First, the data sample related to emotional costs was too small (n=6) for statistical analysis. Second, the inductive codes and themes identified from the data best suit the exploratory nature of this research (Morgan, 2014) providing novel insight into the reasons that students give for opting out of fieldwork. Some argue that the ordinal data produced by Likert scales should be analysed using non-parametric tests (e.g. Kuzon et al., 1996)**.** However, literature, supported by analyses of real and simulated data, suggests that parametric analyses are robust to the violation of assumptions of normality and can be used on ordinal data (Norman, 2010; Wadgave & Khairnar, 2016) especially when Likert scores of many items are summed and provide interval data as is the case here (Norman, 2010; Wadgave & Khairnar, 2016). Indeed, we found no differences in outcomes between

parametric and non-parametric analyses. Therefore, we present the results of parametric analyses as these tests are more powerful (Norman, 2010; Wadgave & Khairnar, 2016).

Results

Quantitative data: Do students who opt out of fieldwork have different fieldwork motivation scores from those who opt in?

The fieldwork motivation scores of students who chose to participate in fieldwork and those who opted out were significantly different. Students who opted out had significantly lower fieldwork motivation ($F=56.31$, $df=1,309$, $p<0.001$; Figure 1A). This trend persisted when the reasons that students gave for opting out were included in the analysis. All three groups of students who opted out (professional development, barrier and disinterest) had significantly lower motivation than those who opted in ($F=27.72$, $df=3,299$, $p<0.001$; Figure 1B).

[Figure 1 near here]

We also investigated whether fieldwork motivation differed in relation to two previously investigated drivers of fieldwork engagement: gender and previous fieldwork experiences and found no significant differences in fieldwork motivation between male and female students ($F=0.915$, $df=1,296$, $p=0.339$; Figure 2A). We also received responses from two non-binary students, which suggested their fieldwork motivation was lower than that of female and male students, but the small sample size made statistical analyses unreliable.

[Figure 2 near here]

Previous experiences of fieldwork, however, did appear to affect fieldwork motivation. Students who had previous fieldwork experiences had significantly higher scores than those who did not ($F=4.978$, $df=1,307$, $p=0.026$; Figure 2B). However, the lowest

motivation scores are also from students with previous fieldwork experiences and these students opted out (Figure 2B).

Finally, we investigated whether students' motivation was influenced by their career plans. Ten themes described students' planned careers (Table 4) and motivation scores did vary dependent upon these ($F=8.052$, $df=9,280$, $p<0.001$; Figure 3). Pairwise comparisons between many categories were non-significant, however, students who planned to seek laboratory-based or medical or health-related careers had significantly lower fieldwork motivation than all other groups.

[Figure 3 near here]

Qualitative data: How can students' choice to opt out of fieldwork be interpreted using expectancy-value theory?

Thematic analysis identified, under the three broad themes, eight reasons for opting out of fieldwork (Table 3). The reasons that students gave for opting out of fieldwork linked directly to three constructs of motivation as theorised by EVT: utility value, intrinsic value and cost, and are discussed in relation to these constructs.

Low utility value

Students who opted out of fieldwork for professional development reasons thought that fieldwork held a low utility value. Their responses included references to skills, goals or a planned career. For example:

> Doesn't aid my career path (UNIB48)

These students have considered the skills required in their target career and sought opportunities to increase their employability. Many highlighted their plan to seek a laboratory-based career and therefore, felt that fieldwork held low utility value as it would

not provide the necessary skills for their future. Alternatively, some students felt that, as they already had some fieldwork experience, an alternative module would have provided greater utility value:

> I generally enjoy fieldwork but wanted the opportunity to practice my lab skills and improve my skills in an area I have less experience in. (UNIF46).

However, 86% (n=12) of the students who gave this reason for opting out were from University F. At this institution, students could choose between a fieldwork module and a laboratory skills module, but could not choose both. The clash was highlighted in some responses:

> There was a lab option, which clashes with fieldwork; lab skills are more relevant to my career plans post-graduation. (UNIF44)

In addition to aligning with low utility value, these reasons of professional development that caused students in this group to opt out align clearly with the conception of loss of valued alternatives cost. Particularly for those students from University F who would have to choose fieldwork over participating in a laboratory skills course.

High cost

For those students who opted out due to a barrier to their participation, fieldwork entailed too high a cost. We use 'cost' here in the context of EVT (a negative consequence of engaging) and when referring to the financial cost of fieldwork (apart from in respondent quotations) we use the term 'fee'.

The most common barrier that caused students to opt out of fieldwork was that the fee was prohibitive (n=19, 73%) and for all these students it was their primary reason:

> Too expensive. Only reason. I love fieldwork. (UNIF55).

> Interesting trips cost too much. (UNIB54)

The (non-financial) cost of fieldwork to students was also increased by three other barriers that each were identified as the primary reason for opting out by small numbers of students: the timing of the field course (n=2), medical or health-related reasons (n=3) and concerns or misunderstanding about what fieldwork entailed (n=2). The timing of the field course caused one student to opt out because it was to take place during the summer vacation period, whilst the other two students cited personal or family commitments that prohibited their participation:

> Dates collided with personal life (UNIF75).

Both fieldwork timing and fees represent loss of valued alternatives cost.

Two of the students who gave medical reasons for opting out cited a lack of mobility due to injury or illness, whilst the third stated simply 'Anxiety' (UNIA40). The two students in the concerns or misunderstandings group also displayed anxiety about fieldwork. For instance, one was concerned that field science contained 'too many variables' and things that were 'likely to go wrong' (UNIE09).

Low intrinsic value

Thirty students' responses indicated that they were disinterested in fieldwork and therefore reflected low intrinsic value. Five of these students indicated that they simply did not like fieldwork and all had previous experiences of fieldwork:

> I don't like fieldwork (UNIE45)

A preference for laboratory-based work over fieldwork was expressed by 14 students. For example:

> I prefer to work in the laboratory, as my point of interest is cell and molecular biology (UNIA30)

The final 11 students who indicated that fieldwork held low intrinsic value opted out because the fieldwork on offer was not relevant to their interests. Their responses demonstrated this in two ways. First, some suggested that fieldwork was not relevant to their course or interests:

> Other modules seemed more appropriate/useful for my interests (UNIA50)

This quotation highlights a lower utility as well as intrinsic value but was categorised as disinterest as the student does not specifically mention professional development. Second, some students stated a desire to study other modules that would not be available if they participated in fieldwork:

> I had other modules I was more interested in so I did not choose the fieldwork module (UNIE60)

> The option to do the field studies module was given before the rest of the module choices for final year. I was afraid there would be a module choice I would prefer to do and be unable. (UNIB39)

Discussion

Our data provide the first insight (to our knowledge) into the choice some students make to opt out of field courses. Using EVT to underpin this research, the data show that students who opt out have lower fieldwork motivation than those who choose to participate. This difference in motivation did not persist when motivation was examined according to gender, which reflects findings from Dunphy and Spellman (2009) and Goulder et al. (2012) who found that male and female students valued fieldwork equally. However, previous experiences of fieldwork did appear to affect motivation in a mostly positive manner. That is, motivation was higher amongst students who had undertaken previous fieldwork than those

who had not. This contrasts with findings from Boyle et al. (2007), Goulder et al. (2012) and Larsen et al. (2017) who all found that students' fieldwork perceptions were independent of having had previous experience. However, Goulder et al. (2012) found that students who recalled a negative memory of fieldwork had lower perceptions than those who did not, and Boyle et al. (2007, p. 308) found that students who had previous experiences were more likely to say that a subsequent field course had 'lived up to [their] fears'. This suggests that simply having had a fieldwork experience might not influence perceptions but whether the experience was positive or negative might influence future opinions. Indeed, our findings might suggest that most students enjoy fieldwork and a high intrinsic value motivates repeat participation. However, the lowest motivation scores are also from students with previous fieldwork experiences and these students opted out (Figure 2B), which might reflect negative past experiences.

The lower motivation of students who opt out of fieldwork is perhaps unsurprising but using EVT has allowed us to explore which aspects of motivation are drivers of students' choice to opt out. Of the five constructs that comprise EVT (expectancy, intrinsic value, utility value, attainment value and cost), three clearly link to the reasons that students gave for opting out of fieldwork. These are intrinsic value, utility value and cost. Within these three constructs, students highlighted several factors that influenced their assessments of fieldwork value and these may have worked collectively to determine fieldwork motivation. Indeed, nine students gave multiple reasons for opting out whilst others may have offered only the factor that exerted the greatest influence on their choice.

Low utility value was demonstrated by students who opted out of fieldwork for reasons of professional development and for many of these students they chose to opt out to pursue an alternative such as a laboratory-based course. Some students had to choose between laboratory skills and fieldwork skills due to the design of their programme, which

included a structural barrier that stopped students from choosing both. Without this barrier, some students may have chosen to study both modules such as those who were positive about fieldwork but chose to study an alternative laboratory module. As well as representing low utility value, these answers represent increased cost in terms of a loss of a valued alternative. Indeed, students were choosing to opt out of fieldwork in some cases in order to be able to choose a more valuable alternative. Perez et al. (2019) suggest that there is a close relationship between utility value and cost in that if an opportunity is perceived to be sufficiently useful in the future this utility value might offset any costs the opportunity might incur. For these students, it appears the opposite is true and that they do not perceive fieldwork have sufficient future usefulness to give up the opportunity to pursue alternatives.

However, of those students who opted out for professional development reasons, three were unsure about their career plans and therefore, might benefit from widening their skills in both field and laboratory work. Wall and Speake (2012) and Peasland et al. (2019) showed that fieldwork allows students to develop a wide range of transferable skills as well as the technical skills that may have been more obvious to these students when making their choices and therefore, might usefully enhance all students' employability. Nevertheless, for some, particularly those who wish to pursue a laboratory or medical or health-related career, the choice to opt out of fieldwork may be the most appropriate for them provided there are alternative opportunities to develop transferable skills elsewhere in their programme.

Students who opted out of fieldwork because of a barrier to participation demonstrated high cost and the reasons they gave fitted two of the components of cost suggested by Flake et al. (2015) and Rosenzweig et al. (2020): loss of valued alternatives, which was represented by high fieldwork fees and the timing of the field course, and emotional cost represented by concerns about fieldwork or health-related reasons. Some suggest that providing fee-free or low-fee fieldwork can remove the financial barrier to

participation (e.g. Mauchline et al., 2013). However, when fee-free or low-fee fieldwork is provided, this might be alongside more expensive exotic trips (Mauchline et al., 2013) and therefore, can create an 'unfair' (Kent et al., 1997, p. 326) situation where some students' choices are limited by financial constraints. We found evidence of this as all students who opted out because of fieldwork fees did have a fee-free option, and 25% of students (n=5) who cited fees as their primary reason for opting out did so because they could not afford the trips that interested them most. Furthermore, financial constraints may extend beyond field course fees and also include loss of earnings from part-time employment, or fear of loss of the employment itself, whilst students are participating in fieldwork (Scott et al., 2012). Therefore, providing fee-free fieldwork does not remove the financial constraint for all students who may otherwise wish to participate. Furthermore, it appears that removing the financial cost does not reduce perceived cost enough that students are inclined to choose fieldwork participation over other alternatives, indeed, Jiang et al. (2018) and Rosenzweig et al. (2020) suggest that when students perceive an activity to have a high cost this can cause avoidance behaviours as our data suggest.

The barriers of concern over fieldwork and medical or health reasons largely indicated that students experienced anxiety over fieldwork suggesting that both of these barriers represented unacceptable emotional cost. Stokes and Boyle (2009) found that some of their students were anxious before a field course although this was mitigated by the field experience, however, our data suggest that for some students anxiety increases cost to a level that causes them to disengage. Scott et al. (2019) suggest that some anxieties associated with the uncertainty of fieldwork might be mitigated somewhat by the inclusion in a programme of more frequent local fieldwork undertaken at or near to the university and enables students to become confident in the field. Indeed, Tucker and Horton (2018) suggest that many of the factors that may increase anxiety about fieldwork relate to travelling, being away from

home-based support networks and being in an unfamiliar setting. Therefore, increased familiarity with fieldwork may reduce some students' concerns about undertaking a residential field course and reduce this cost. However, for some, anxiety about fieldwork might have significant negative impacts on their health, which Tucker and Horton (2018) discuss in relation to academics who teach in geography, earth and environmental science subjects. Participants in their research described fieldwork as an ordeal that they avoid, which demonstrates how anxiety can constitute an unacceptable emotional cost.

For students who cited a lack of interest fieldwork held a low intrinsic value. Their reasons fell into three codes, the first of which was a clear dislike for fieldwork stated by five students all of whom had participated in fieldwork before. This supports our previous assertion that students' motivation might be influenced by whether a previous experience was positive or negative. It is possible that students who opted out because of a stated dislike for fieldwork perceived an unacceptable emotional cost as they did not wish to repeat a negative experience.

The disinterested students who cited a preference for laboratory work or other module choices clearly felt that participating in fieldwork would increase loss of valued alternatives cost. The students who display a preference for laboratory work appear to view the laboratory and the field as opposite spaces. Indeed, at University F the laboratory and the field are presented as opposing spaces as students are offered a choice between a field course and a laboratory skills module. Goulder et al. (2012) investigated this contrast by assessing students' perceptions of compulsory laboratory work and fieldwork assuming that students would express a preference for one or the other. However, they found a positive correlation between students' perceptions of laboratory work and fieldwork, which might suggest an inclination towards practical work *per se*. However, our respondents do appear to hold a clear preference for laboratory-based work. This choice to pursue laboratory-based learning might

be prudent if students wish to pursue a laboratory-based career; however, only two of the 14 students who cited a preference for the laboratory wished to do so.

In the case of students who opted out to study other modules, it is important to consider that students' module choices may not always centre on interest and could relate to perceived difficulty, or perceived high effort cost, but the students who gave this reason specifically highlight interest in valued alternatives. It is understandable that the ecology field courses on offer might not have interested some of these students as seven of the 11 in this category wished to seek careers related to laboratory work or medicine. However, some students in this group were interested in ecology and conservation but still opted out of fieldwork in favour of pursuing other modules or, in the case of one student, for fear of not being able to, which provides a second example of how a structural barrier in programme design might cause students to opt out of fieldwork who might otherwise wish to participate.

The reasons that students gave for opting out of fieldwork can be linked to utility or intrinsic value or cost. Although students did not give reasons that clearly linked to expectancy and attainment value, these constructs likely still influenced students' fieldwork motivation, though less explicitly. The factors most influencing students' choice to opt out and how they relate to EVT and therefore, fieldwork motivation are illustrated in Figure 4. The reasons can also be interpreted in terms of different conceptualised components of cost, which may help to consider how these findings can influence future practice.

[Figure 4 near here]

Implications for practice

Most of the students we surveyed (75%, n=247) did choose to participate in field courses. However, those who opt out miss an opportunity to develop a wide range of employability-enhancing skills (Peasland et al., 2019; Wall & Speake, 2012), and that mediates deeper learning (Boyle et al., 2007) and builds stronger relationships between

students and staff (Stokes & Boyle, 2009). It is therefore essential that programmes involving optional fieldwork provide other opportunities for students to engage in learning that provides equivalent opportunities.

Some students are prevented from participating in fieldwork by barriers including finance, timing and family responsibilities. Some of these students had motivation scores that were amongst the highest of all respondents and, therefore, might welcome opportunities to engage with fieldwork outside of the structure of a traditional field course. Fleischner et al. (2017) suggest that 'the field' should be redefined and they and Wilson et al. (2016) suggest that fieldwork could be undertaken in local sites such as urban neighbourhoods, parks, botanical gardens or university campus space. Using such sites could allow fieldwork to be integrated into the regular university timetable (Wilson et al., 2016) rather than eating into vacation periods, and this strategy would allow students (and for that matter staff) for whom field courses entail a high cost to participate in fieldwork. Peacock et al. (2018) and Peacock and Bacon (2018) have reported on successful fieldwork undertaken on or close to university campuses during timetabled teaching. They found that benefits of longer residential trips such as skills development (Peacock & Bacon, 2018) and strengthened social relationships (Peacock et al., 2018) were replicated in these shorter fieldwork activities.

Some of the benefits of fieldwork are not always readily apparent to students. For example, (Wakeham, 2016) suggests they have difficulty recognising the transferable skills they develop throughout their degree programmes. Indeed, the responses from some students in this study suggest that they focused on technical skills when making their fieldwork participation decision. EVT posits that a high utility value might encourage engagement despite low intrinsic value (Eccles & Wigfield, 2002). Therefore, highlighting the utility of fieldwork, for example through signposting the technical and transferable skills outcomes of fieldwork to ensure that students are fully informed when making their choice. Increasing

employability is a key motivation of students for engaging in higher education (Furnell & Scott, 2015; Tavares, 2017) but some students can have trouble identifying the employability value of fieldwork-developed skills (Peasland et al., 2019). Moreover, Wall and Speake (2012) suggest that the employability-enhancing benefits of fieldwork should be made explicit.

Relevance interventions are an approach that could make the utility benefits of fieldwork explicit or alter students' cost perceptions of fieldwork. Relevance interventions have been reported by Gaspard et al. (2015), Perez et al. (2019) and Rosenzweig et al. (2020) who sought to change students' perceptions of activities by increasing utility value or decreasing cost. Such interventions may be more effective than signposting the benefits of fieldwork if they involve students in active reflection. Indeed, Gaspard et al. (2015) suggest that reflection is critical to successful interventions. For example, Gaspard et al. (2015) implemented an intervention with school students studying mathematics by presenting quotations from college students about how mathematics was useful in their lives. The school students were then asked to reflect on these in the context of their own lives. This intervention significantly increased the utility value of mathematics (Gaspard et al., 2015). Rosenzweig et al. (2020) found that similar interventions targeting utility value or cost positively influenced students' motivational beliefs in a college physics class. Contrastingly, Perez et al. (2019) found that an intervention that sent regular videos to students via email did not show any effects, but this intervention did not require any formal reflection on the part of the students. The incorporation of a reflective relevance intervention, using quotations from previous students, at the point at which students make their fieldwork participation choice, could be used to ensure they have fully considered the implications of their decision to opt in or out. However, the effectiveness of such interventions may vary between students. For example, students who chose to opt out of fieldwork because of a perceived high cost and

who also had previous negative experiences of fieldwork might be unlikely to choose to participate after undertaking a relevance intervention as they are unlikely to want to repeat a negative experience. Indeed, although relevance interventions have been shown to impact students' motivation (Gaspard et al., 2015; Rosenzweig et al., 2020), high cost has also been shown to predict students' adoption of maladaptive or avoidance behaviours (Jiang et al., 2018) and Rosenzweig et al. (2020) showed that a cost reduction intervention had limited impact on some students' cost perceptions.

Opting out of a field course might allow students to pursue alternative opportunities and, for some, this might be an appropriate choice. It is important that these students can also access the benefits fieldwork provides. For example, well-designed laboratory work can provide opportunities for students to develop transferable skills (George-Williams et al., 2018; Reid & Shah, 2007) alongside the technical laboratory skills that students seemed to be identifying when choosing between laboratory or fieldwork modules. However, some laboratory teaching where students are required to follow step-by-step instructions might not allow students to develop transferable skills (Davies, 2008). Indeed, Davies (2008) links increased autonomy with student development and we have shown that increasing student autonomy during fieldwork allowed students to develop a wide range of transferable skills (Peasland et al., 2019). Therefore, well-designed laboratory-based courses with opportunities for student autonomy may do the same. That is not to say that all fieldwork could be replaced by laboratory-based learning, however, as there are many technical field skills that could not be delivered without field-based learning opportunities. These technical skills are as important as transferable skills for students who may wish to pursue an environmental career and are valued highly by relevant employers (LWEC, 2012; Sutcliffe & O'Reilly, 2010; Thomas, 2009).

Finally, every effort should be made to ensure that structural barriers within a programme do not stop students participating in fieldwork who might otherwise wish to do so. For example, one student opted out because they were unaware of the other module options available and fearful that they would later discover they could not study something they would find more valuable. Similarly, at University F the programme design made students choose between field and laboratory-based studies. The UK Quality Code for Higher Education states that programmes should offer equal access for all students and "arbitrary and unnecessary barriers to learning" should be eliminated (QAA, 2018, p. 5). This highlights the need for careful programme design to ensure that easily removed barriers do not persist.

Limitations and further research

Our findings offer some novel insight, into students' fieldwork participation choices but there are some limitations and opportunities to further explore the perceptions of students when making fieldwork participation choices. First, the sample size of 311 students was small in comparison with some EVT-based studies, for example, Guo et al. (2015) surveyed over 10,000 participants in their study and Trautwein et al. (2006) and Gaspard et al. (2015) close to 2,000. Perez et al. (2019) and Rosenzweig et al. (2020) conducted useful studies with smaller samples of 234 and 148 participants respectively indicating that our sample is still valid. However, a larger sample would likely yield a greater number of students who opted out and therefore allow a more detailed analysis of their motivation scores and reasons, possibly with respect to the different components of cost, which was not appropriate with our sample. Given that many of the reasons that students gave for opting out aligned with the components of cost, future research might consider creating a fieldwork motivation scale that addressed effort, emotional and loss of valued alternatives cost more directly.

Our study approach of collecting data via a questionnaire yielded only brief insights into the reasons that students opted out of fieldwork and many students offered just one reason to explain their choice to opt out. A qualitative study using interviews or focus groups would allow an in-depth exploration of students' reasons as some answers, such as those from students who indicated they enjoyed fieldwork but still opted out, suggest that there are complex factors influencing their decision, which may warrant further investigation.

Conclusion

In conclusion, we have provided a novel evidence-based insight into the reasons that some students opt out of fieldwork and have used this information to recommend approaches that could be used to maximise the likelihood of students who wish to participate being able to do so. Our data have shown that students' fieldwork motivation can help to explain why some opt out of field courses and that these students perceive fieldwork to be less valuable than those who participate. Some students who opt out might be making a prudent choice to engage in alternative activities that best prepare them to meet their future employment goals. However, some students have high fieldwork motivation but encounter barriers that prevent them from participating in fieldwork within the framework of the field courses offered. All those who do not participate should be offered opportunities to engage in activities that offer similar benefits to a field course whether that be through well-designed laboratory investigations with some opportunity for student autonomy or via a re-conceptualisation of the field that tackles the barriers currently preventing participation for some students. Furthermore, programmes should be carefully designed to ensure that structural barriers do not stop students, who might otherwise wish to participate, from engaging in an activity that has been shown to offer an opportunity for professional development and deep learning.

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Table 1. Locations, fees and durations of the field courses on offer at each university. UK: Field course in the UK, EU: Field course outside of the UK but within Europe, WW: Field course outside of Europe.

University	Trip location(s)	Fee	Duration
A	UK x 1	£0	1-day courses > 2 weeks equivalent
	EU x 1	£650 approx.	2 weeks
	WW x 4	£1000 - £1800	2 weeks
B	UK x 1	£0	7 days
	EU x 1	£350 + food	10 days
	WW x 2	£1200 approx.	12-14 days
C	WW x 2	£400 + travel	10 days
D	UK x 1	£140 approx.	5 days
	EU x 2	£400 - £550	5 days
E	UK x 1	£0	4 x 1-day courses
	WW x 1	£1700	2 weeks
F	UK x 1	£0	1-day courses = 2 weeks equivalent
	WW x 2	£750 - £1800	2 weeks

Table 2: Examples items for each construct of EVT from the fieldwork motivation scale

Expectancy	I find fieldwork easy
Utility Value	Fieldwork is important to my career pathway
Intrinsic Value	I dislike fieldwork
Attainment Value	For me, being good at fieldwork is important
Cost	Participating in fieldwork means that I have to miss events that are important to me

Table 3: The themes that explain the reasons students gave for opting out of fieldwork and the reasons that were cited in each theme. Eight students (10% of those who opted out) did not provide a reason for their choice to opt out of fieldwork. Cost type indicates the reasons related to conceptions of the different types of cost (LVA = loss of valued alternatives). *Two students' responses indicated they did not understand what a field course entailed e.g. concerns about not having access to necessary equipment, which would be provided.

Theme	**Cost type**	**Reason (inductive code)**	**Number of students citing**	**Number of students citing as primary reason**
Professional development	LVA	Relevance to future plans/career/skills	16	14 (18%)
Barrier to participation	Emotional	Concern/misunderstanding*	2	2 (3%)
	LVA	Financial cost	19	19 (24%)
	Emotional	Medical/health	4	3 (4%)
	LVA	Timing	4	2 (3%)
Disinterest in fieldwork	Multiple	Dislike	5	5 (6%)
	LVA	Preference for laboratory work	16	14 (18%)
	LVA	Irrelevant for degree/interests	13	11 (14%)

Table 4: Codes that indicate the career students planned to pursue. 21 (7%) students declined to answer the question.

Planned Career	**Examples**	**Number of students**
Academic or research	Field researcher; Lecturer	46 (15%)
Animal work	Zookeeper; Aquarist; Animal rehabilitation	25 (8%)
Conservation	Conservation work; Park ranger	46 (15%)
Consultancy	Ecologist; Environmental consultant	17 (5%)
Further Study	Master's and/or PhD	17 (5%)
Laboratory-based	Biotechnologist; Laboratory technician	11 (4%)
Medical or Health-related	Veterinary medicine; Doctor; Drug development	13 (4%)
Teaching	Schoolteacher; Environmental education	18 (6%)
Unsure		67 (21%)
Other	Police; Personal trainer; Wildlife photographer	30 (10%)

Table 5: Chronbach's Alpha values for fieldwork motivation scale subscales. Values can range from 0-1. Scores above 0.7 are considered acceptable and scores between 0.65-0.7 minimally acceptable (DeVellis, 2017b).

Construct	**Alpha Value**
Expectancy	0.73
Utility Value	0.81
Intrinsic Value	0.91
Attainment Value	0.91
Cost	0.68

Table 6: Variables included in data for quantitative analyses and the categories used to describe the data.

Variable	**Categories**
Gender	Female/Male/Non-binary/Prefer not to say
Previous fieldwork experience	Yes/No
Fieldwork choice	Opt in/Opt out
Reasons for participation choice	In/Out-Professional Development/Out-Barrier/Out-Disinterest

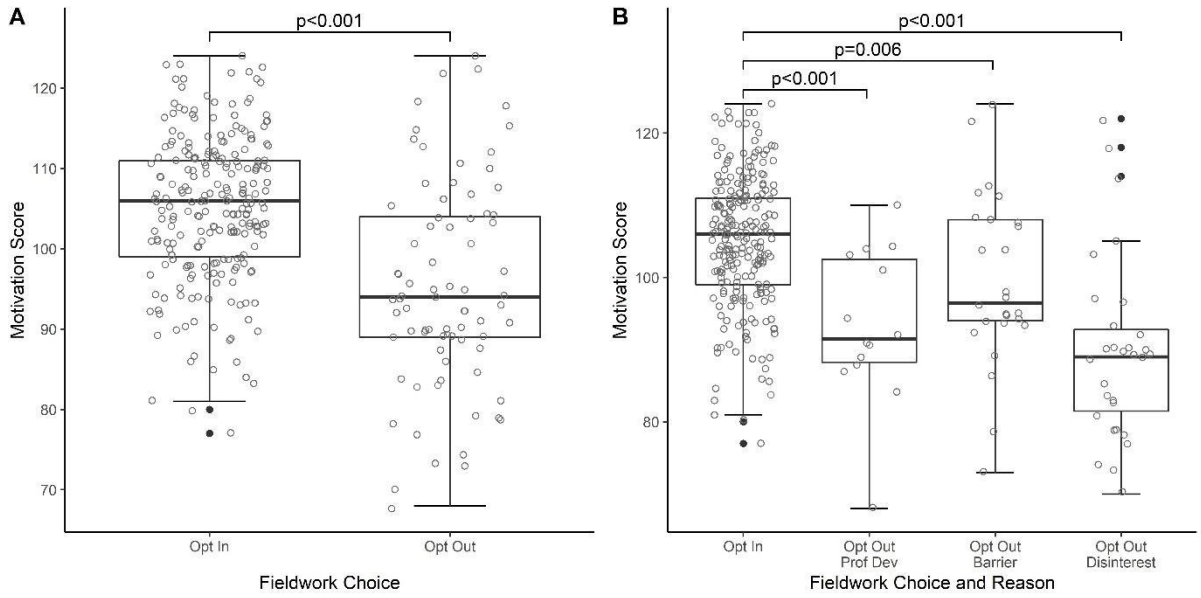

Figure 1: Differences in motivation scores between A: students who opted into and out of fieldwork and B: the students who opted out of fieldwork (grouped by their reason for opting out) compared with those who opted in.

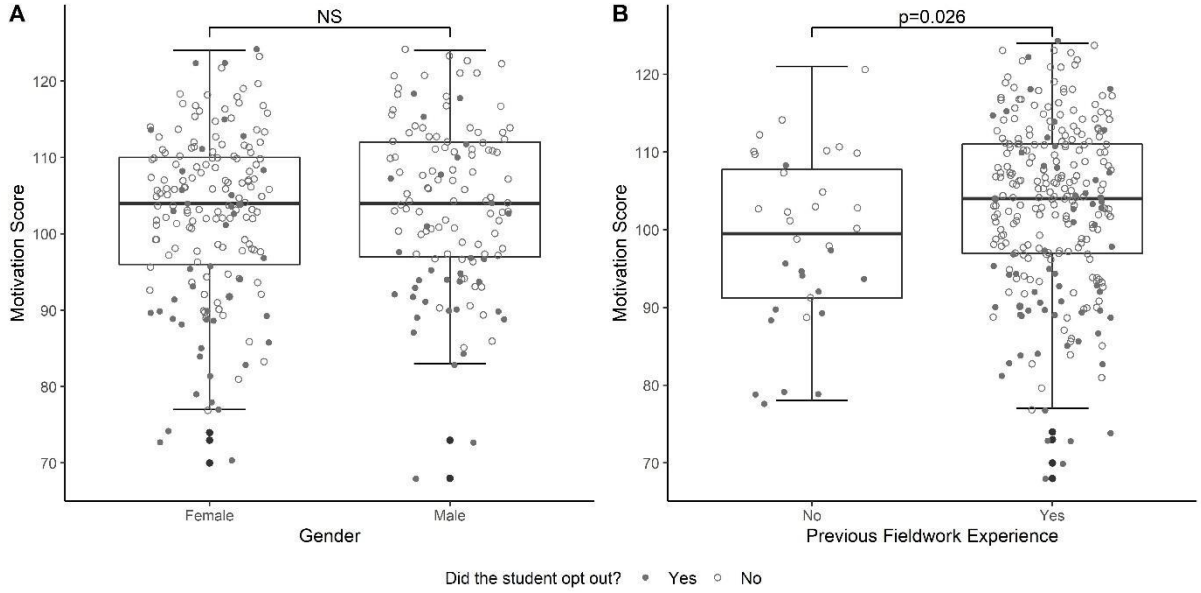

Figure 2: Motivation scores of students dependent on gender (A) and whether they had previous fieldwork experiences (B).

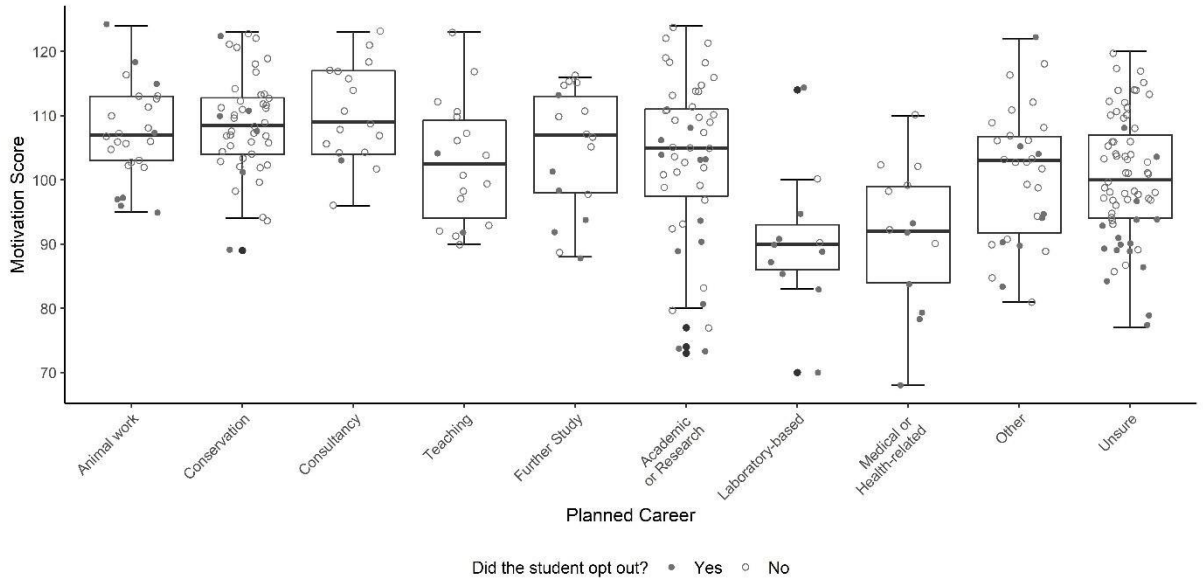

Figure 3: Motivation scores of students dependent on the career they planned to pursue after graduation.

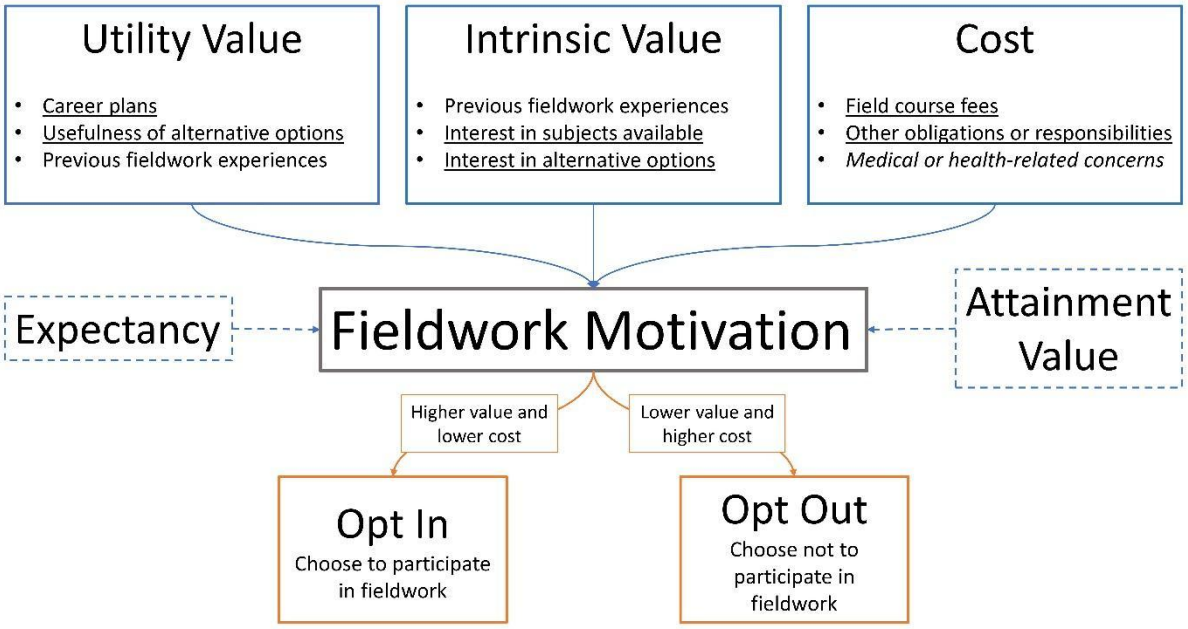

Figure 4: The factors identified as influential in the choice to opt out of fieldwork. The reasons students stated relate to utility value, intrinsic value and cost. Factors that are underlined link also to perceived loss of valued alternatives cost and those in italics to perceived emotional cost. Previous fieldwork experiences could increase or decrease multiple aspects of cost. It is likely that expectancy and attainment value do influence students' participation choice, but these were not stated explicitly in their responses.