A holistic approach to environmental volunteering: connections between motivation, well-being and conservation achievement

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Abstract

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Environmental volunteering, such as biodiversity monitoring and practical conservation volunteering, provides a unique opportunity for achieving positive outcomes for both volunteers and conservation. While the social sciences have focussed on motivation, well-being and health benefits for volunteers, the environmental sciences have focussed on conservation outcomes. However, these parallel research agendas must be merged into a multidisciplinary, holistic approach to fully comprehend the complexities of the volunteering process and optimise outcomes. This thesis provides a first step in this direction by drawing together and extending research across psychology, health and conservation with the aim of investigating the relationships between environmental volunteer motivation, volunteer well-being and conservation achievement as perceived and experienced by volunteers and volunteer managers. Data collected from UK onsite and worldwide online surveys of nature-based activity participants, volunteers and volunteer managers are used to investigate these relationships. This thesis uncovers hitherto unknown discrepancies between perception and reality by volunteers and managers of volunteer motivation, well-being and conservation achievement. Environmental volunteers have a hierarchy of motivations, with value-based motives and desire to learn and be outdoors being more important, that was not recognised by volunteer managers. Similarly, volunteer managers underestimated the positive effect volunteering had on volunteers' well-being. Interestingly, volunteers and managers rated the same conservation achievements differently, highlighting the need to develop and communicate more objective measures. Volunteers and managers both perceived that more motivated volunteers with higher levels of well-being would lead to increased conservation achievement, but this research found no such direct link between volunteer motivation and well-being and conservation achievement. This surprising result may be due to a shift in environmental volunteering towards a more experience-focused pattern of engagement. Volunteers, though interested in conservation, now also expect personal benefits from their volunteering, without which they leave. The implications of this change is that managers need to understand their volunteers' motivations and well-being better to create fulfilling experiences where not only conservation, but also the volunteering experience itself, is at the centre.

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Author's declaration

I confirm that the work presented in this thesis is my own work, with the following exception:

Chapter 4 is published in collaboration with Rick Stafford, Susanna Curtin and Anita Diaz as:

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Chapter 1 Introduction

This thesis draws together, builds on and extends research across psychology, well-being and health as well as conservation with the aim of evaluating the relationships between environmental volunteer motivation, volunteer well-being and conservation achievement. Over the last two decades there has been a surge of research on volunteering. However, this research is spread among many disciplines including sociology (e.g. Wilson 2000; Musick and Wilson 2008), psychology (e.g. Clary et al. 1998; Finkelstein et al. 2005; Abell 2013), health studies (e.g. Borgonovi 2008; Day et al. 2012; Jenkinson et al. 2013), leisure studies (e.g. Butcher and Smith 2010; Rattan et al. 2012), economics (e.g. Day and Devlin 1998; Govekar and Govekar 2002) and conservation biology (e.g. Hart et al. 2012; Buesching et al. 2014). Rarely have interdisciplinary approaches or reviews been attempted (but see Omoto and Snyder 1990; Musick and Wilson 2008). Therefore many findings are limited to individual disciplines and have reached only a subset of the potential target audience among academics and conservation practitioners, thereby limiting the usefulness of the research.

An interdisciplinary approach to volunteer research is needed to fully comprehend the complexities of volunteering and optimize the usefulness of research in the form of outcomes for volunteers, organisations and causes such as conservation. One way to approach this is to visualise volunteering as a three-stage process rather than seeing volunteering as only the time volunteers spend actually volunteering (Omoto and Snyder 1990; Musick and Wilson 2008) (Figure 1.1). The three stages of volunteering will each be examined in this thesis and are: stage 1, the time before volunteering including the basis, context and motivations for volunteering; stage 2, the actual volunteer experience including continued motivation and immediate well-being; and stage 3, the time after volunteering including the outcomes of volunteering for all parties and causes involved (Omoto and Snyder 1990; Musick and Wilson 2008).

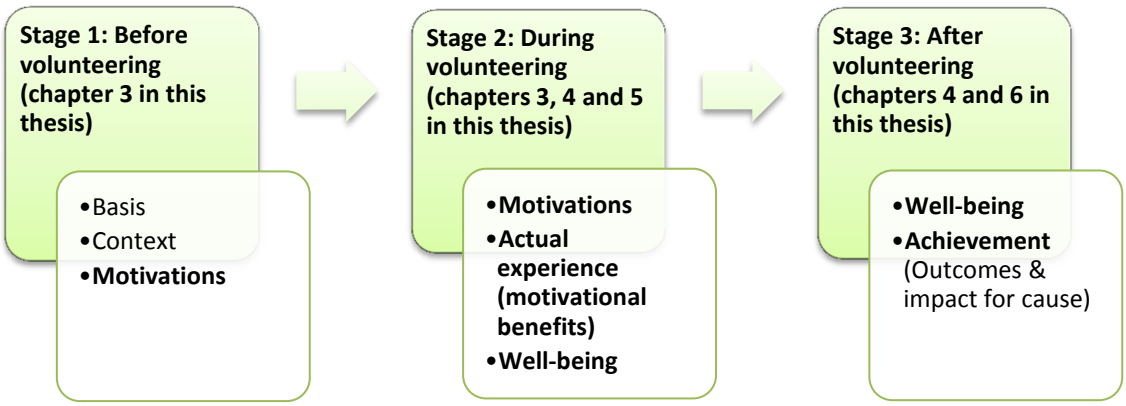


Figure 1.1. The three stages of volunteering (based on Omoto and Snyder 1990) and the chapters in this thesis investigating these stages.

This thesis evaluates volunteer motivations in stage 1 (chapter 3), volunteer motivations, actual volunteer experience and immediate well-being in stage 2 (chapters 3, 4 and 5) and remembered volunteer well-being and conservation achievement in stage 3 (chapters 4 and 6). The remaining part of this introduction reviews existing research on volunteering and proposes a new model of environmental volunteering, tested within this thesis, which includes volunteer motivation and well-being as well as conservation achievement. It ends with an outline of the research questions and structure of this thesis.

1.1 Volunteering

Volunteering attracts millions of people worldwide every year (Cabinet Office 2014; Corporation for National & Community Service 2014). As volunteer contexts differ among and within cultures and change over time, it is important to realise that volunteers, volunteering and the definition of volunteering also changes (UN 2001). For the purpose of this thesis, the UN definition of volunteering is adopted which encompasses the following three core elements:

> *"First, it is not undertaken for financial gain. Second, it is carried out freely and without compulsion. Third, it benefits both the volunteer and the person or party whom the action is meant to aid. By emphasizing exchange and reciprocity, this last point challenges the traditional stereotype of volunteering as charity"*
>
> (UN 2001, p.12)

It is now widely recognised and accepted that volunteers also benefit from the activities they undertake and the idea of volunteers being 'pure' (i.e. only altruistic) in their motivations for volunteering has been mostly abandoned (see review in Musick and Wilson 2008). This change in how volunteering is perceived has stimulated new research areas into volunteer motivation (Stukas et al. 2009; Güntert et al. 2016) and benefits of volunteering to volunteers themselves for example in relation to their health and well-being (Jenkinson et al. 2013).

New research areas also improve knowledge about the different contexts volunteering can occur in such as formally through an organisation or group (e.g. Snyder and Omoto 2008) or informally by helping people outside one's own household (Cnaan et al. 1996). Some previous definitions of volunteering included the amount of time volunteers commit, e.g. "…helping activities that extend over time…" (Snyder and Omoto 2008, p. 3). However, many researchers (incl. Cnaan and Handy 2005; Ockenden 2007; Hustinx et al. 2008; Wilson 2012) suggest that volunteering is changing from something often undertaken over 'extended periods of time' to now being of a more episodic character. Although the empirical basis for this argument is not strong as there is no historical comparative data available (Hustinx and Lammertyn 2003), there is an apparent trend in volunteering changing from a stable, regular pattern of involvement to a more noncommittal and individualised involvement (Hustinx 2010), where volunteers often do not commit to volunteering at certain times, such as once a week, but expect to be able to volunteer when it suits their busy schedules.

Changes in the pattern of volunteering in the developed world could be a consequence of this part of the world currently entering into an 'experience economy', where people are shifting focus from wanting goods and services to wanting experiences (Pine and Gilmore 1999, 2011; Sundbo and Sørensen 2013). Different categories of experiences exist: entertainment, which is passive participation like watching television; educational, more active participation like taking a class; escapist, greater participant immersion and active participation; and aesthetic, participant immersion but passive participation (Pine and Gilmore 1998). Volunteering mostly sits within the escapist category, though it can provide elements from the other categories such as educational experiences like identification skills in biodiversity monitoring. The rise in some forms of volunteering, like episodic volunteering, may be partly driven also by the technological advances that have made it possible for people to get involved online for brief periods of time (Silvertown 2009), which can improve the sense of volunteering as an experience. Some organisations take advantage of this and encourage episodic volunteering, for example the Big Garden Birdwatch in the UK involves about half a million people for one

weekend a year (The RSPB 2015). Such opportunities enable a large number of people to experience environmental volunteering at least on a small scale.

1.1.1 Types of environmental volunteering

Environmental volunteering is distinguished from other types of volunteering by providing an opportunity for people to spend time outdoors, to connect or reconnect with nature, to better understand nature and to find their own place in nature (Gooch 2005; Dalgleish 2007; Guiney and Oberhauser 2009). Usually, environmental volunteering is conducted in a formal setting under the direction of an organisation such as a Wildlife Trust, the National Trust, The Conservation Volunteers, The Wilderness Society or smaller local groups or associations (O'Brien et al. 2010), and can either be conducted as part of ongoing reserve management or for an ongoing or a time-limited project. Volunteering in nature can encompass many different activities including biodiversity monitoring, practical conservation work and education such as leading nature walks (Measham and Barnett 2008). For the purpose of this thesis, the term 'environmental volunteering' includes only biodiversity monitoring and practical conservation work and these are the focus areas of volunteering for this research.

Biodiversity monitoring within the context of environmental volunteering is a type of citizen science. Citizen science is defined as "public participation in scientific research" (Shirk et al. 2012). The involvement of the public in scientific recording has a long history dating from tracking locust outbreaks in China almost 2000 years ago (Tian et al. 2011) to plant phenology monitoring starting in 1736 (Sparks and Carey 1995) and the still extant yearly Christmas Bird Count run by the National Audubon Society in the USA since 1900 (Silvertown 2009). Over the last two decades, citizen science has become increasingly popular and used by more scientists and organisations (Silvertown 2009; Catlin-Groves 2012; Roy et al. 2012). Specific projects range from online astronomy (e.g. Galaxy Zoo 2015) and DNA sequence analysis (McGill University 2010) to outdoors environmental monitoring of plants and animals (e.g. Koss et al. 2009; Schmeller et al. 2009), and hands-on collection of water or air samples (Davies et al. 2011). The impressive proliferation in the number and types of citizen science projects may be attributed to several factors, including the advancement of appropriate technological platforms for engaging volunteers (Newman et al. 2012), the realisation in the research community that the public represents a large resource in terms of labour and skills, the fact that many large funders now require project-related science outreach (Silvertown 2009) and a push from local communities and individuals to be involved in science (Roy et al. 2012).

Practical conservation volunteering typically involves local communities and individuals through a range of different organisations such as Wildlife Trusts, National Trust and the Forestry Commission (O'Brien et al. 2010). Traditionally, the image of a practical conservation volunteer was that of a white middle class person but this has now changed as more people realise the wide range of benefits that volunteering can bring (O'Brien et al. 2010). Practical conservation volunteers undertake important work that would otherwise not have been done and the work is often related to habitat restoration, which aims to safe-guard or reintroduce rare species to the improved habitat area, clearance of invasive species or practical reserve management (O'Brien et al. 2010). Typical volunteer activities are often physically demanding and include pulling, cutting or clearing invasive species, planting, pond clearing or re-establishment, coppicing, hedge laying and construction of walkways (Ryan et al. 2001; Rannap 2004; Gill 2005; Reidy et al. 2005; O'Brien et al. 2010; Chatters 2013a).

1.2 A model of environmental volunteering

This thesis proposes and tests a new model of environmental volunteering which builds on the three-stage process of volunteering (Omoto and Snyder 1990) described above. This model proposes that factors of the three stages of volunteering are connected in a non-linear interdisciplinary model of volunteering (Figure 1.2). This new model of environmental volunteering suggests that fulfilling volunteer motivations is important for conservation organisations in order to achieve conservation outcomes and volunteer well-being but that increasing volunteer well-being is also a critical factor to achieving better conservation outcomes.

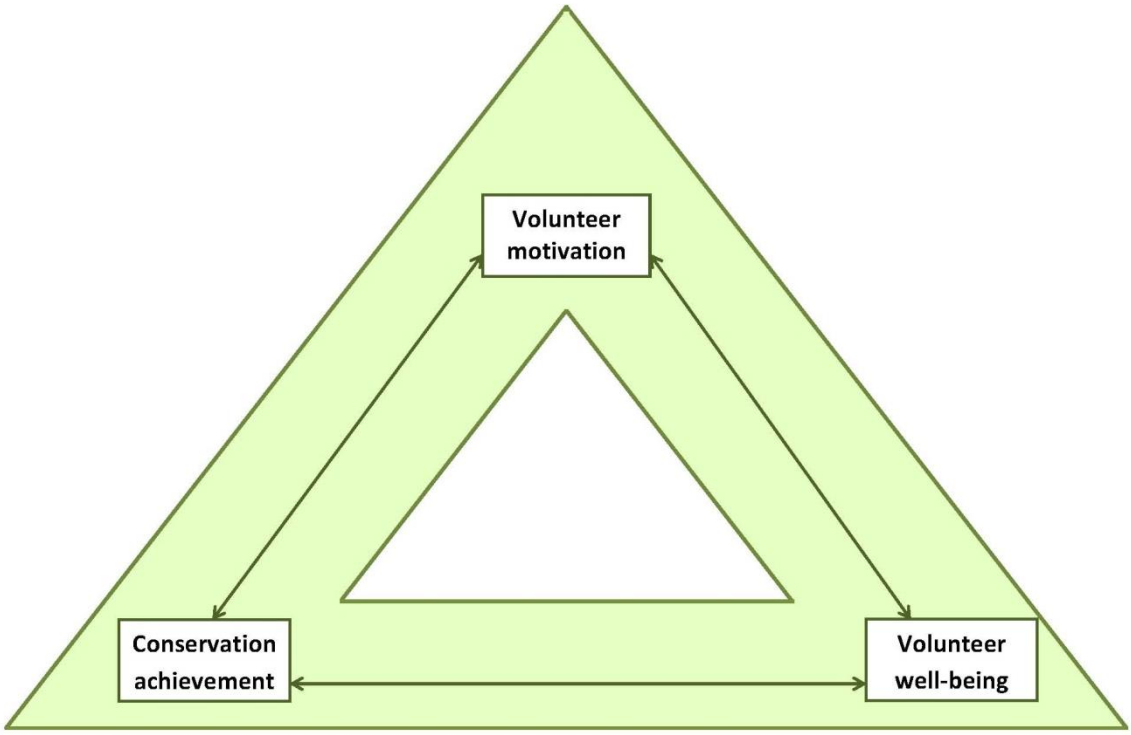


Figure 1.2. The proposed model of environmental volunteering. The model proposes that fulfilling volunteer motivations is important for conservation organisations in order to achieve conservation outcomes and volunteer well-being but that increasing volunteer well-being is also a critical factor to achieving better conservation outcomes.

The first element of this new model, volunteer motivation, originates from the first stage of volunteering (Musick and Wilson 2008) and it is the first topic of investigation in this thesis. Without motivation to volunteer, irrespective of the nature of the motivation, there will be no volunteers and no benefits to organisations, causes and volunteers themselves. Recruiting volunteers is a continuous struggle and motivating potential volunteers has a high priority for many organisations (Stukas et al. 2016a), making identifying volunteer motivations a key focus for organisations. The second element of the model is volunteer well-being and it is the second topic of investigation in this thesis. The volunteering experience may have an immediate (stage two) or longer-term (stage three) effect on the well-being of volunteers, affecting such elements as happiness, health and social relationships (Thoits and Hewitt 2001; O'Brien et al. 2010; Pillemer et al. 2010). Volunteers can choose to leave their volunteer roles if they feel unhappy with their volunteer experience, thus making volunteer well-being another key focus for organisations relying on volunteer involvement.

The model proposes that these two elements of volunteering, volunteer motivation and volunteer well-being, are connected through the volunteering experience itself in stage two. Volunteer motivation is part of the second stage of volunteering, as well as the first stage, in the sense that people will need motivation to continue volunteering, and furthermore it is

through the actual volunteering experience that motivations may be fulfilled (Clary et al. 1992; Musick and Wilson 2008). When the volunteering experience fulfils the motivations of volunteers, their satisfaction with the volunteering experience increases and they are more likely to continue volunteering to the benefit of both organisations and the volunteers themselves (Clary et al. 1992; Stukas et al. 2009). Therefore the association between volunteer motivation and volunteer well-being through the fulfilment of motivations is the third topic of investigation in this thesis and a full introduction and investigation into this association is provided in chapter 5. Finally, the environmental volunteering model proposes that motivated volunteers feeling their motivations are fulfilled through their volunteering experience are more satisfied and have increased well-being, which is vital to the achievement of conservation goals. The associations between volunteer motivation, volunteer well-being and conservation achievement are therefore the fourth and last topic of investigation in this thesis.

1.3 Research outline

1.3.1 Overall aim

The aim of this research is to evaluate the relationships between volunteer motivation and well-being and whether they impact on conservation achievement.

1.3.2 Research questions

This aim is addressed through answering the following research questions:

1. What motivates different types of environmental volunteers compared to non-environmental volunteers, how do volunteer managers perceive the motivations of their volunteers and how does this compare to volunteers' actual motivations?

2. How does environmental volunteering affect participants' immediate sense of well-being compared to the effect of other nature-based activities on participants' immediate sense of well-being, how do volunteers remember their volunteering-related well-being later on, how do volunteer managers perceive the well-being of their volunteers and how does this compare to volunteers' actual sense of well-being?

3. How well are volunteer motivations fulfilled through motivational benefits for different groups and what are the synergies between volunteer motivation, motivational benefits and volunteer well-being?

4. How do different volunteer motivations, motivational benefits and fulfilment and volunteer well-being associate with and predict conservation activity and outcome goal achievement?

1.3.3 Thesis structure

Given these research questions, the thesis provides a series of chapters that initially introduces the overall context, proposed environmental volunteer model and methodology of the research (chapters 1 and 2), followed by four chapters focusing on individual elements and relationships within the proposed environmental volunteer model (chapters 3, 4, 5 and 6), drawing together the findings in a final discussion (chapter 7).

The seven chapters are outlined below:

Chapter 1: Introduction, provides the background for this thesis and the proposed model for environmental volunteering. The research is placed within the context of volunteer motivation and well-being in conservation and citizen science.

Chapter 2: Methodology, introduces the research approach, research design applied and data collection techniques used.

Chapter 3: Environmental volunteer motivation: Managers' perception and volunteers' actual motivations, explores the motivations of volunteers and how volunteer managers perceive volunteer motivation in order to address the first research question.

Chapter 4: Environmental volunteer well-being: Managers' perception and actual well-being of volunteers, investigates volunteer well-being and how volunteer managers perceive volunteer well-being in order to address the second research question.

Chapter 5: The association between volunteer motivations and volunteer well-being, and the significance of fulfilling motivations, explores the synergies between volunteer motivation and volunteer well-being through fulfilment of motivations in order to investigate the relationship between findings from the previous two chapters and address the third research question.

Chapter 6: The importance of volunteer motivations and well-being for achieving conservation activity and outcome goals, examines synergies between actual and perceived volunteer well-being, volunteer motivation and conservation activity and outcome goal achievement to address the fourth research question.

Chapter 7: Overall discussion, brings together the results from this research and evaluates the proposed model of environmental volunteering in light of these findings. It also includes relevant recommendations, both for further research and for conservation organisations working with volunteers.

Due to the wide range of topics covered in this thesis, abstracts are provided for the four data chapters (3, 4, 5 and 6) to ease the overview of topics for the reader. The next chapter presents the methodology of this research, including the research approach and design applied as well as the data collection techniques used.

Chapter 2 Methodology

2.1 Introduction

This chapter introduces the quantitative approach and the research designs applied in the three studies presented in this thesis. The three studies are:

Study 1: an onsite survey of practical conservation volunteers and biodiversity monitoring volunteers as well as their managers, in addition to control groups for the volunteer groups which were walkers and students, respectively. The survey measured motivation and well-being for all groups and conservation goal achievement for volunteer groups.

Study 2: an online survey of former, current and potential future volunteers, measuring motivation, motivational benefits, well-being and perceived conservation goal achievement.

Study 3: an online survey of former, current and potential future volunteer managers, measuring perceived volunteer motivation, motivational benefits and well-being as well as actual conservation goal achievement.

The chapter further presents the data collection techniques used and data preparation performed for surveys spanning more than one chapter. Data analyses pertaining to just one chapter are presented in the methods of the relevant chapter.

2.2 Research approach

This research used quantitative methods for data collection and combined an onsite survey (study 1) with two online surveys (studies 2 and 3). Volunteer motivation, motivational benefits and volunteer well-being were investigated using existing and adapted models (Table 2.1). Volunteer motivations were explored using an adapted version, informed by an extensive literature review, of Clary et al.'s (Clary et al. 1992, 1998) Volunteer Functions Inventory (studies 2 and 3, see section 2.3.2.1). Volunteer motivations were then matched with adapted versions of motivational benefits (Clary et al. 1998; Stukas et al. 2009) (studies 2 and 3, see section 2.3.2.2). The approach taken in this research to studying well-being was directed by positive psychology and the PERMA ('positive emotions', 'engagement', 'meaning', 'positive relationships', 'achievement') Theory of well-being proposed by Seligman (2011) (see section 2.3.2). Volunteer well-being was evaluated using an adapted version of the PERMA Profiler (Butler and Kern 2016) (used in all studies). As there was no existing framework for measuring conservation outcomes from volunteering, conservation output and outcome measures were developed specifically for this research (used in all studies, see section 2.3.2.4).

Table 2.1. Sources of the main elements of questionnaires used in the three studies for this research.

Element	Studies	Source
Volunteer motivation	2, 3	Adapted from Clary et al. (1992) and other studies (see Table 2.3)
Functional benefits	2, 3	Adapted from Clary et al. (1998) and other studies (see Table 2.4)
Well-being	1, 2, 3	Adapted from Seligman (2011) and Butler and Kern (2016)
Conservation outcome measures	1, 2, 3	Developed from literature review and discussions with relevant people in the conservation sector

2.2.1 Ethics

This research project was approved through the Ethics approval process at Bournemouth University (ref ID 2419). Written informed consent from participants was assured through participant information sheets for all surveys (appendix I) as well as consent statements on the questionnaires themselves. It was reiterated by activity leaders and the researcher that participation was voluntary and participants were free to withdraw at any time before the data were aggregated and analysed. No information was collected from participants that could identify them as individuals. Data from completed paper-based questionnaires were entered in Excel and subsequently destroyed. To ensure confidentiality and data protection, online surveys used a secure SSL-encrypted connection to a securely hosted website.

2.3 Research design and data collection

The three main elements of this research, volunteer motivation and motivational benefits, volunteer well-being, and conservation output and outcomes, are all essential in environmental volunteering. To investigate synergies between these elements, it was necessary to design studies that included several elements, thereby contributing to answering more than one research question, and therefore also contributing to more than one chapter, of this thesis (Table 2.2). The next sections will present the practical considerations regarding the use of questionnaires (section 2.3.1), the main elements of the questionnaires with the background and development of survey items (section 2.3.2) and the specific research design and data collection for the three studies conducted (sections 2.3.3, 2.3.4 and 2.3.5).

Table 2.2. Overview of research questions (chapters), studies and elements in this thesis.

Research question	Study 1 (onsite)	Study 2 (online, volunteers)	Study 3 (online, volunteer managers)
1. What motivates different types of environmental volunteers compared to non-environmental volunteers, how do volunteer managers perceive the motivations of their volunteers and how does this compare to volunteers' actual motivations? (chapter 3)		Motivation	Motivation
2. How does environmental volunteering affect participants' immediate sense of well-being compared to the effect of other nature-based activities on participants' immediate sense of well-being, how do volunteers remember their volunteering-related well-being later on, how do volunteer managers perceive the well-being of their volunteers and how does this compare to volunteers' actual sense of well-being? (chapter 4)	Well-being	Well-being	Well-being
3. How well are volunteer motivations fulfilled through motivational benefits for different groups and what are the synergies between volunteer motivation, motivational benefits and volunteer well-being? (chapter 5)	Motivation level + well-being	Motivation + motivational benefits + well-being	Motivation + well-being
4. How do different volunteer motivations, motivational benefits and fulfilment and volunteer well-being associate with and predict conservation activity and outcome goal achievement? (chapter 6)	Motivation level + well-being + conservation	Motivation + motivational benefits + well-being + conservation	Motivation + well-being + conservation

2.3.1 Design and delivery of questionnaires – practical considerations

Questionnaire design is a complex process and many factors need to be taken into account, including question order, questionnaire length and layout in addition to questionnaire delivery methods (Payne 1971; Foddy 1995; Peterson 2000). Questionnaires should be piloted before final use to ensure clarity of questions (Foddy 1995; Peterson 2000) and questionnaires used in this research were all piloted (see study description sections 2.3.3, 2.3.4 and 2.3.5 for details).

2.3.1.1 Question order

The order in which questions are asked on a questionnaire can influence the responses, either by way of prior questions 'priming' or 'anti-priming' responses to following questions (Foddy 1995). Priming makes respondents think about a topic and thereby respond differently to subsequent questions than they would otherwise have and anti-priming prompts a need in respondents to be consistent in responses by taking earlier responses into account when answering later questions (Foddy 1995). Asking more general questions before specific questions, the 'funnel' approach, was suggested as a way of eliminating some of the priming and anti-priming effects (Kahn and Cannell 1957). For example, Turner (1984) conducted a series of experiments on measuring happiness and found that first asking about how happy people were with their marriage before asking how happy people were overall influenced the responses to the second question, possibly either by the feelings about marriage influencing the second question or by respondents subtracting the marriage factor in the second question. In this research, this effect was taken into account by asking people first about their overall satisfaction before moving on to ask about specific elements of their well-being.

2.3.1.2 Questionnaire length and layout

Research has shown that the length and layout of questionnaires influence the response rate, survey time and respondent satisfaction (Toepoel et al. 2009; Yan et al. 2011). For online questionnaires, scrolling was identified as a reason for non-responses and it was recommended to keep the number of items on each page to how many can be accommodated on the page without scrolling, usually between four and ten items (Toepoel et al. 2009). Limited numbers of items per page also decreased survey time and increased respondent satisfaction (Toepoel et al. 2009), something that was important in this research as well to not put undue pressure on respondents. Informing respondents about the expected duration of a survey and using a progress bar have been suggested as important to questionnaire completion, though progress indicators only significantly increased response rates for short (105 items) questionnaires and seemed to lower response rates for long (155 items) questionnaires (Yan et al. 2011). A time estimate was provided to participants in all surveys in

this research; however, for the online surveys it was not possible to present a progress bar due to different numbers of questions being presented based on answers to previous questions.

2.3.1.3 Questionnaire delivery and survey participation

Paper-based questionnaire delivery was chosen for study 1 due to the survey locations, logistics and the immediate completion of questionnaires needed. Locations for study 1 were often outdoors and away from access to computers and a trial of bringing laptops for participants to use was not successful. So as not to put undue pressure on volunteers to participate in the survey, only a subset of volunteers were asked to participate each time in the first project group. This was based on the concern that some volunteers might feel pressured into participating if all other volunteers in the group participated. One reason for this concern was that these groups were not 'fixed' groups and volunteers might not know each other very well, leading to volunteers feeling insecure and not wanting to stand out by being the only one opting out of the survey. Following discussion with volunteer managers from the other participating groups, the questionnaire was offered to all participants in a group at the same time, as volunteers in these groups were more 'fixed' than in the first project group. This led to volunteers often knowing each other well and they were perceived to feel secure in their groups by their volunteer managers, thus opting out of the survey was accepted by the group and no undue pressure was put on non-participating volunteers.

An online approach was adopted for studies 2 and 3 due to the geographic spread and numbers of targeted participants even though online surveys consistently yield a lower response rate than other modes of surveys (Manfreda et al. 2008). Online surveys were conducted using Limesurvey software (LimeSurvey Project Team and Schmitz 2012). The questionnaires were tested in standard browsers (Chrome, Firefox, Internet Explorer, Safari), using the most recent versions as well as some older versions.

An inherent issue with questionnaires is that some questions may be seen as intrusive by some respondents leading to respondents opting out of completing the questionnaires (Tourangeau et al. 2000). This potential issue was mitigated in this research by not making any questions compulsory and thus respondents could chose to skip questions and still complete the rest of the questionnaire. This approach did reduce the number of responses for certain elements of the questionnaires, though it is believed to have had an overall beneficial effect on response numbers.

2.3.1.4 Linking different surveys

During this research it was necessary to link questionnaires in study 1, i.e. 'before' and 'after' questionnaires, whilst maintaining the anonymity of respondents. This was accomplished using self-generated identification codes, a common method used when conducting anonymous surveys (Schnell et al. 2010). Often-cited elements were used in this research, i.e. the first three letters of birth place, number representing the month you were born and first initial of mother's first name (Kearney et al. 1984; Yurek et al. 2008; Schnell et al. 2010; Wilson et al. 2010).

2.3.2 Main elements of questionnaires

The main elements of the questionnaires were volunteer motivation, motivational benefits and well-being as well as conservation activities and outcomes as already outlined in Table 2.2. The following four sections will present the theoretical background of these elements and outline how they were measured.

2.3.2.1 Motivation element of questionnaires

Volunteer motivations were investigated using a functional approach based on Clary et al.'s (1992, 1998) Volunteer Functions Inventory (VFI) (appendix II). Based on an extensive literature review, the VFI (Clary et al. 1998) was adapted to reflect more recent research on motivations and environmental and societal contexts (Ryan et al. 2001; Roggenbuck et al. 2001; Esmond and Dunlop 2004; Bruyere and Rappe 2007; Dolnicar and Randle 2007; Guiney and Oberhauser 2009; Wahl 2010; Raddick et al. 2010, 2013; Bramston et al. 2011; Asah and Blahna 2012; Chatters 2013b) (Table 2.3). Motivations related specifically to environmental and societal values in volunteering were identified and motivational items were added to two new proposed factors 'Environmental values' and 'Societal values'. 'Environmental value' items were only presented to environmental volunteers and volunteer managers and 'societal value' items were only presented to non-environmental volunteers and volunteer managers. The adapted and expanded VFI was used in studies 2 and 3. All items were scored on a 7-point Likert scale (Likert 1932) ranging from 1 (*not at all important or accurate)* to 7 (*extremely important or accurate*).

The validity of the adapted VFI was examined through exploratory and confirmatory factor analyses, detailed in chapter 3. The validity of the model was assessed separately for studies 2 and 3 as their contexts differed. For study 2, the validity of the adapted model was assessed within the context of self-reported volunteering, whereas in study 3 it was assessed within the context of volunteer managers' perception of volunteering. Identified motivational factor

values were calculated as means of all items belonging to that individual factor. The Mean Motivation Score was calculated as the mean of all items presented.

Table 2.3. Proposed motivational factors with items and item sources used in this research. Items listed were used in study 2, the online volunteer survey, and were adapted for study 3, the online volunteer manager survey.

Factor	Motivational item	Source
Career		
	Volunteering can help me to get my foot in the door at a place where I would like to work	Clary et al. 1998
	I can make new contacts that might help my business or career	Clary et al. 1998
	I can learn skills that support my career development	Asah and Blahna 2012; Esmond and Dunlop 2004; Guiney and Oberhauser 2009 (adapted)
	Volunteering experience will look good on my CV	Clary et al. 1998 (adapted)
Enhancement		
	Volunteering allows me to discover new areas/species that I did not have access to earlier	Raddick et al. 2010; Raddick et al. 2013 (adapted)
	By volunteering I can get exercise/better health	Asah and Blahna 2012; Chatters 2012; Guiney and Oberhauser 2009 (adapted)
	Volunteering makes me feel needed	Clary et al. 1998
	I enjoy spending time volunteering outdoors	Bruyere and Rappe 2007; Guiney and Oberhauser 2009; Roggenbuck et al. 2001 (adapted)
	Volunteering is a way to meet new people with similar interests	Clary et al. 1998
Protective		
	No matter how bad I have been feeling, volunteering makes me feel better	Clary et al. 1998
	By volunteering I feel less lonely	Clary et al. 1998
	Volunteering allows me to spend time in a beautiful setting	NT 2012; Roggenbuck et al. 2001 (adapted)
	Volunteering provides an escape from all the demands of everyday life	Clary et al. 1998 (adapted)
	I feel I am doing something worthwhile	Cnaan and Goldberg-Glen 1991; Dolnicar and Randle 2007 (adapted)
Social		
	Volunteering allows me to spend time with family/friends	Dolnicar and Randle 2007; Roggenbuck et al. 2001; Wahl 2010 (adapted)
	I like being part of a larger community of volunteers	Roggenbuck et al. 2001 (adapted)
	Family and friends place a high value on volunteering	Clary et al. 1998 (adapted)
	I enjoy being part of a cohesive volunteer team	Bramston et al. 2011; Wahl 2010 (adapted)

Factor	Motivational item	Source
Understanding		
	I can learn new things	Asah and Blahna 2012; Bruyere and Rappe 2007; Guiney and Oberhauser 2009; Ryan et al. 2001
	Volunteering allows me to gain a wider perspective on the world	Clary et al. 1998 (adapted)
	Volunteering is an opportunity to get practical hands-on experience	Clary et al. 1998 (adapted)
	Volunteering allows me to use my skills	Chatters 2013; Dolnicar and Randle 2007 (adapted)
Values	I feel it is important to help	Clary et al. 1998 (adapted)
	I can do something for a cause that is important to me	Clary et al. 1998
	I believe I can make a difference	Bramston et al. 2011; Roggenbuck et al. 2001 (adapted)
	My spiritual/religious beliefs encourage me to help	Cnaan and Goldberg-Glen 1991; Dolnicar and Randle 2007 (adapted)
Fun - single item added		
	Volunteering is fun	Bramston et al. 2011; Bruyere and Rappe 2007; Ryan et al. 2001 (adapted)
Environmental values		
	Volunteering is a way for me to give something back to the environment	Asah and Blahna 2012; Guiney and Oberhauser 2009 (adapted)
	I can help to protect the environment for future generations	Bramston et al. 2011; Bruyere and Rappe 2007 (adapted)
	Volunteering is a way for me to contribute to environmental sustainability	Asah and Blahna 2012
	I can help identify/eliminate threats to the environment	Roggenbuck et al. 2001 (adapted)
	I enjoy seeing improvements to the environment as a result of my volunteering effort	Bramston et al. 2011; Bruyere and Rappe 2007; Ryan et al. 2001 (adapted)
	I can help collect information to improve the management of the area	Roggenbuck et al. 2001 (adapted)
	I am excited to contribute to original scientific research	Raddick et al. 2010; Raddick et al. 2013
Societal values		
	Volunteering is a way for me to give something back to the community	Asah and Blahna 2012; Guiney and Oberhauser 2009 (adapted)
	I can help to protect the areas (such as cultural, historical, community, etc.) where I volunteer for future generations	Bramston et al. 2011; Bruyere and Rappe 2007 (adapted)
	Volunteering is a way for me to contribute to the sustainability of society	Asah and Blahna 2012
	I can help identify/eliminate threats to the areas (such as cultural, historical, community, etc.) where I volunteer	Roggenbuck et al. 2001 (adapted)
	I enjoy seeing improvements within the areas where I volunteer	Bramston et al. 2011; Bruyere and Rappe 2007; Ryan et al. 2001 (adapted)
	I can help collect information to improve the management within areas where I volunteer	Roggenbuck et al. 2001 (adapted)

2.3.2.2 Motivational benefit element of questionnaire

Motivational benefits, sometimes called functional benefits or affordances, are activities or situations that allow people to satisfy their motivations (Clary et al. 1998; Stukas et al. 2005, 2009). Motivational benefits are based on the functional approach's 'matching principle' where specific benefits match specific motivations. Individual motivational benefit items used in this research were identified and adapted from the literature to match the proposed motivation factors in the adapted Volunteer Functions Inventory used (Table 2.3 for adapted VFI items), resulting in 12 motivational benefit items (Table 2.4). However, after factor analysis of motivations (see chapter 3), only five of these proposed motivational factors remained, leaving out the 'enhancement' motivational factor and therefore also the 'enhancement' motivational benefit factor. The resulting motivational benefit factors are described in chapter 5, section 5.2.2.2. Volunteer motivational benefits were only measured in study 2, as questionnaires in study 1 needed to be kept short to ensure the highest possible participation. Items were rated on a 7-point Likert scale. The motivational benefit factor values were calculated as means of the items belonging to the individual factors. The mean motivational benefit score (MMBS) was calculated as the mean of all 12 motivational benefit items on the questionnaire.

Table 2.4. Proposed motivational benefit factors, motivational benefit items and their sources used in study 2.

Factor	Motivational benefit item	Source
Career		
	I learned some skills that will be useful in my future career by volunteering	Clary et al. 1998; Stukas et al. 2009 (adapted)
	In volunteering with this organisation, I made new contacts that might help my business or career	Clary et al. 1998; Stukas et al. 2009
Enhancement		
	My self-esteem is enhanced by performing volunteer work in this organisation	Clary et al. 1998; Stukas et al. 2009
	I feel better about myself as a result of my volunteering	Clary et al. 1998; Stukas et al. 2009 (adapted)
Protective		
	I was able to escape some of my troubles	Clary et al. 1998; Stukas et al. 2009
	By volunteering I feel less lonely	Clary et al. 1998; Stukas et al. 2005 (adapted)
Social		
	The work I perform as a volunteer is appreciated	Clary et al. 1998 (adapted)
	I live up to the expectations of my friends or family by volunteering	Stukas et al. 2005 (adapted)
Understanding		
	Through volunteering, I learn more about nature	Stukas et al. 2005; Stukas et al. 2009 (adapted)
	I learn something new about the world by volunteering	Clary et al. 1998 (adapted)

Factor	Motivational benefit item	Source
Values		
	Through volunteering here, I am able to express my personal values	Clary et al. 1998 (adapted)
	Through volunteering here, I am doing something for a cause that I believe in	Clary et al. 1998; Stukas et al. 2009 (adapted)

2.3.2.3 Motivational Fulfilment Index (MFI)

The Motivational Fulfilment Index (MFI) was only possible to calculate from responses in study 2, where respondents had reported on their motivations and motivational benefits. To calculate the MFI, a 'match score' was calculated for each motivational factor, 'values', 'understanding', 'social', 'protective' and 'career', and multiplied by the motivation's ranking, and all resulting values were then summed to create the MFI. The match score was '1' if the motivational benefit factor value was equal to or greater than the motivational factor value, i.e. the motivation was fulfilled, otherwise it was scored as '0'. Motivational factors were based on the average motivational factor value, with the highest value having a rank of 5 and the lowest value a rank of 1 to reflect the differential importance of motivations. When there were ties, the rankings were split, i.e. if two values were the same and would have rankings 4 and 3, both were awarded 3.5. Subsequently the MFI was calculated as the match score for each factor multiplied by the rank of that factor (e.g. 'understanding' match score x 'understanding' factor rank) and summed across factors. With five possible matches and rankings from 5 to 1, the MFI ranges between 0 (no matches at all) to 15 (all five motivations fulfilled). This way of calculating the MFI recognises that all motivations are not equally important to volunteers and it allows a match of low importance motivations to have an, albeit small, positive effect, unlike previously suggested match indices by Clary et al. (1998) and Stukas et al. (2009).

2.3.2.4 Well-being element of questionnaires

The well-being element of the questionnaires was based on the PERMA well-being theory proposed by Seligman (2011) which includes the five well-being elements: 'positive emotion' (P), 'engagement' (E), 'relationships' (R), 'meaning' (M) and 'achievement' (A). No measure for the model was proposed by Seligman, but Butler and Kern (2016) developed the PERMA Profiler (PERMA-P) measure based on the model (appendix III). The PERMA-P consists of the five well-being elements proposed by Seligman as well as additional items for other elements of well-being considered important, including negative affect and physical health (in this thesis termed 'health'). Each of these seven well-being elements is represented by three items. 'Loneliness' and 'happiness' are presented as single items on the PERMA-P. Satisfaction, a common single measure of well-being used by national statistics offices (Cabinet Office 2014), was not included in the PERMA-P but following Hone et al. (2014) it was added to

questionnaires in this research and evaluated separately to well-being. All items were scored on an 11-point (0-10) Likert scale (Likert 1932).

The wording of two items in the PERMA-P was changed after the first pilot study of the questionnaire and discussing the questionnaire with volunteers, volunteer managers and colleagues. The two words, 'loved' and 'angry', were seen by volunteers to be 'quite American' and badly fitted to a British volunteering context. The 'love' item wording was changed from "To what extend do you feel loved?" to "To what extend do you feel appreciated?" The 'angry' item wording was changed from "How often do you feel angry?" to "How often do you feel frustrated?" (see Table 2.5 for the adapted PERMA-Ps used in this research). The adapted PERMA-P was used in study 1 to measure general well-being of participants before an activity and measure level of activity-related well-being immediately after the activity. In study 2, the adapted PERMA-P was used to measure the remembered well-being during volunteering of current volunteers and the general well-being of former and potential volunteers. In study 3, it was used to measure the perceived well-being of volunteers by volunteer managers.

The validity of the adapted PERMA-P was examined through exploratory and confirmatory factor analyses, detailed in chapter 4. The validity of the model was assessed separately for the volunteer studies (studies 1 and 2) and the volunteer manager study (study 3) as their contexts differed. For studies 1 and 2, the validity of the adapted model was assessed within the context of self-reported volunteering, whereas in study 3 it was assessed within the context of volunteer managers' perception of volunteering. Well-being factor values were calculated as the mean of the items belonging to the individual factors. Overall mean well-being was calculated as the mean of all 23 well-being-related items on the questionnaire including the 15 PERMA items as well as items for 'health', 'negative emotions' (reverse scored), 'loneliness' (reverse scored) and 'happiness'.

Table 2.5. Adapted PERMA Profiler well-being elements and associated items used in study 1 for measuring A) general well-being and B) activity well-being and based on the original PERMA Profiler by Butler and Kern (2016).

Well-being element	A) Adapted PERMA-P items, general well-being	B) Adapted PERMA-P items, activity well-being (volunteering example)
Positive emotion	In general, how often do you feel joyful?	How much of the time did you feel joyful during volunteering today?
	In general, how often do you feel positive?	How much of the time did you feel positive during volunteering today?
	In general, to what extent do you feel contented?	To what extent do you feel contented right now after having volunteered?
Engagement	How often do you become absorbed in what you are doing?	To what extent did you become absorbed in your volunteering tasks today?
	In general, to what extent do you feel excited and interested in things?	To what extent did you feel excited and interested in things during your volunteering today?
	How often do you lose track of time while doing something you enjoy?	To what extent did you lose track of time during volunteering today?
Positive relationships	To what extent do you receive help and support from others when you need it?	To what extent did you receive help and support from others when you needed it during your volunteering today?
	To what extent do you feel appreciated?	To what extent have you been feeling appreciated during your volunteering today?
	How satisfied are you with your personal relationships?	How satisfied were you with your interactions with other people during volunteering today?
Meaning	In general, to what extent do you lead a purposeful and meaningful life?	To what extent did you find your volunteering today purposeful and meaningful?
	In general, to what extent do you feel that what you do in your life is valuable and worthwhile?	To what extent did you feel that what you did during your volunteering today was valuable and worthwhile?
	To what extent do you generally feel you have a sense of direction in your life?	To what extent do you feel you have a sense of direction in your volunteering?

Well-being element	A) Adapted PERMA-P items, general well-being	B) Adapted PERMA-P items, activity well-being (volunteering example)
Achievement	How much of the time do you feel you are making progress towards accomplishing your goals?	How much of the time did you feel you were making progress towards accomplishing your goals volunteering today?
	How often do you achieve the important goals you have set for yourself?	To what extent did you achieve the important goals you had set for your-self during your volunteering today?
	How often are you able to handle your responsibilities?	During your volunteering today, how often were you able to handle your responsibilities?
Negative emotion	How often do you feel anxious?	How much of the time did you feel anxious during your volunteering today?
	How often do you feel frustrated?	How much of the time did you feel frustrated during volunteering today?
	How often do you feel sad?	How much of the time did you feel sad during volunteering today?
Health	In general, how would you say your health is?	How would you say your health is right now after volunteering?
	How satisfied are you with your current physical health?	How satisfied are you with your physical health right now after having volunteered?
	Compared to others of your same age and sex, how is your health?	Compared to others of your same age and sex, how is your health right now after volunteering?
Single items	Taking all things together, how happy would you say you are?	How happy are you right now after volunteering?
	How lonely do you feel in your daily life?	How lonely did you feel during your volunteering today?

2.3.2.5 Conservation activity and outcome element of questionnaires

As there were no appropriate existing evaluation tools for measuring conservation outcomes from volunteering available, conservation outcome measures were developed specifically for this research. Through extensive literature review and discussions with volunteer managers, conservation organisation staff and other academics working in the conservation field, it became clear that conservation outcomes are extremely variable across volunteer projects and even outputs from the same project differ widely depending on volunteer activity and time of year. To enable comparison between groups and types of volunteering, it was decided to base evaluation of outputs and outcomes on the importance and achievement of tasks and goals as perceived by the volunteers and as evaluated by volunteer managers, rather than on specific tangible outputs such as number of records submitted or area cleared of invasive species. Conservation output, the direct effects of the volunteer activities such as records submitted or area cleared of invasive species, were evaluated through questions on 1) actual activities performed (goals stated at the outset of the activity), 2) importance of those activities for conservation, and 3) how well those activity goals were reached by the end of the day (appendices IV, V, VI and VII for full questionnaires; example items are listed in Table 2.6). In study 2, conservation outcomes, the longer term impact of volunteering activities, were evaluated through questions on 1) actual outcomes, 2) importance of outcomes, and 3) the extent to which outcomes are generally reached through volunteering activities.

Table 2.6. Conservation activity output and outcome items from questionnaires. Study 1: example items are from the volunteer manager questionnaire.

	Task description	Importance	Achievement
Study 1 Output	Please list the conservation tasks for the volunteer activity today, being as specific as you can *(e.g. collection of X number of records, collect records for certain species or species groups, planting X number of trees, clearing a certain area (X hectares) of invasive species, involving X number of volunteers, etc.)*	Please indicate how important you think each task is for conservation on a scale from 1 (not at all important) to 7 (extremely important)	Please indicate how well the conservation goals set for today's activity were reached on a scale from 1 (not at all achieved) to 7 (completely achieved)
Study 2 Output	Thinking about the conservation activities you do while volunteering (e.g. removing unwanted species, recording species, planting, etc.), please list the 3 activities you do the most	Please rate how important you think each activity you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)	Please rate to what extent you think the goals of the conservation activities you listed above are generally reached on a scale from 1 (never achieved) to 7 (always achieved)

	Task description	Importance	Achievement
Study 2 Outcome	Thinking about the conservation outcomes (the effect of your activities) from your volunteering (e.g. habitat improvement, increased species recording, eradication of invasive species, etc.), please list the 3 conservation outcomes you believe to be most important	Please rate how important you think each outcome you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)	Please rate to what extent you think each conservation outcome you listed above is generally reached by volunteering activities on a scale from 1 (never achieved) to 7 (always achieved)
Study 3 Output	Thinking about the conservation activities your volunteers perform (such as removing unwanted species, recording species, planting, etc.), please list the 3 activities your volunteers do the most	Please rate how important you think each of the activities you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)	Please rate to what extent you think the goals of the conservation activities you listed above are generally reached on a scale from 1 (never achieved) to 7 (always achieved)
Study 3 Outcome	Thinking about the conservation outcomes, i.e. the effects of your volunteers' activities such as habitat improvement, increased species recording, eradication of invasive species, etc., please list the 3 conservation outcomes you believe to be most important for conservation	Please rate how important you think each outcome you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)	Please rate to what extent you think each conservation outcome you listed above is generally reached by volunteering activities on a scale from 1 (never achieved) to 7 (always achieved)

2.3.3 Study 1: Onsite nature-based activity participant survey

The aim of the onsite survey was to compare the effect of different nature-based activities on participant well-being and explore the synergies between level of motivation, well-being and conservation outputs, thereby contributing to research questions 2, 3 and 4 of this thesis. The survey was designed as a paired before-activity and after-activity survey of four groups of people: biodiversity monitoring volunteers, practical conservation volunteers, walkers or students doing fieldwork, as well as their activity leaders.

2.3.3.1 Organisations and participants

The onsite study involved participants from nine different environmental volunteer organisations from Southern England, eight biodiversity monitoring organisations and two practical conservation organisations, as well as their control groups which were students conducting fieldwork as part of their university course and walkers, respectively (Table 2.7). Environmental organisations were invited to participate in the study based on them conducting environmental volunteer activities in groups. Biodiversity monitoring volunteers surveyed different aspects of biodiversity, such as animals, plants or lichens. Practical conservation volunteers performed physically demanding conservation tasks, such as clearing areas of invasive species, coppicing or hedgelaying. Control groups were invited based on their

group activity being similar to the volunteer activity and conducted in the same natural environments as the volunteer activities of the environmental organisations. Students were chosen as the control group to the biodiversity monitoring volunteers, as both groups were conducting ecological fieldwork in similar areas, but whereas volunteering is often seen as altruistic (Smith 1981; Unger 1991), students did the fieldwork because it was a requirement of their university courses. Walking groups were chosen as the control group for the practical conservation volunteers as both activities were performed outdoors in similar areas and were somewhat physically demanding, but the purpose of the activities were again different, with volunteering being partly altruistic and walking only benefitting the walkers themselves. Also, walking is the most popular activity in the natural environment in England (Natural England 2015) and walking programmes are promoted as health interventions to decrease negative affect and mental illness and increase well-being in participants (Marselle et al. 2014; Iwata et al. 2016). Individual group sizes for all activities were 2-66 people with 1-3 activity leaders per group. Time spent on an activity varied from one to eight hours, with longer-lasting activities including breaks for morning coffee and lunch.

Table 2.7. Study 1: Respondents and descriptive statistics of groups in the onsite survey.

Activity type	Organisations	n_{before}	n_{after}	Number of sample dates	Group sizes (mean ±SD)	Hours of activity (mean ±SD)
Biodiversity monitoring		91	79	16	12.83 *(±6.16)*	3.71 *(±1.62)*
	Cornwall Wildlife Trust					
	Devon Wildlife Trust					
	Dorset Flora Group					
	Dorset Wildlife Trust					
	Exmoor National Park					
	Hampshire and Isle of Wight Wildlife Trust					
	National Trust					
	Somerset Botany Group					
Students		123	109	6	39.20 *(±21.72)*	3.95 *(±1.20)*
	Bournemouth and Poole College					
	Bournemouth University					
	Kingston Maurward College					
Practical conservation		100	101	15	15.62 *(±9.52)*	4.57 *(±1.06)*
	Dorset Wildlife Trust					
	Forestry Commission, New Forest					
Walkers		73	62	10	23.70 *(±4.28)*	2.77 *(±0.79)*
	New Forest Walkers					
	Verwood Ramblers					

2.3.3.2 Survey instruments and procedure

Participant questionnaire. The main elements of the participant questionnaire were the well-being element and, for the volunteers, the conservation output element (appendix IV for participant questionnaire). Before the activity, participants responded to questions about their general level of well-being as well as their level of motivation for volunteering on that day (termed 'day-specific motivation') and frequency, hours and tenure of participating in the activity. Volunteers were also asked about the specific tasks for the day and how important they perceived those tasks to be. After the activity, participants responded to questions about their activity-related well-being as well as their level of general motivation for the activity and activity duration. Volunteers also rated how well they perceived the conservation tasks set for the day had been reached. This element was irrelevant to students and walkers and was therefore omitted in their surveys. Activity participants only completed questionnaires once to ensure independent samples even if they were present at later activities where other activity participants completed questionnaires. Data were collected using paper-based questionnaires.

Activity leader questionnaire. One activity leader per group participated by completing a different questionnaire to the activity participants (appendix V for volunteer manager questionnaire). The main element of the volunteer leader questionnaire was the conservation output element. Before the activity, volunteer leaders responded to questions about the specific tasks for the day and how important those tasks were for conservation. After the activity, volunteer leaders rated to what level the conservation tasks set for the day had been achieved. This element was irrelevant to student and walker leaders and was therefore omitted in their surveys. After the activity, all activity leaders responded to questions about their tenure as activity leader and the number of participants in the group on the day.

Pilot studies. A pilot study was conducted with volunteers from the National Trust to test question formulations and questionnaire layout (n=22). Feedback was critical on two items from the PERMA-P and these items were adapted accordingly (discussed in section 2.3.2.4). A second pilot study was then conducted with volunteers from the Bournemouth Natural Science Society to test the adapted question formulations and questionnaire layout (n=5). Minor adaptations were implemented based on feedback from the volunteers. Data from the pilot studies were not included in the final sample as the questionnaire had changed significantly from the first pilot study and volunteers were only inside on the day of the second pilot study.

Data collection. Participation in the survey was voluntary and a brief verbal introduction to the researcher and the PhD project was given before people decided to participate or not. The introduction described the project in overall terms and introduced the questionnaire; however, the introduction avoided any mentioning of expected findings so as not to influence the responses of participants. Participants were asked to complete a five-page questionnaire just before they started their activity ('before-activity' questionnaire) and another five-page questionnaire just after they finished their activity ('after-activity' questionnaire). The activity leader completed the activity leader questionnaire which was also divided into a 'before-activity' and 'after-activity' part. Data collection was conducted between April 2014 and November 2015. Date, weather, activity type and organisation details were recorded on each activity day.

2.3.4 Study 2: Online volunteer survey

The aim of the online volunteer survey was to collect data to contribute to answering all four research questions. Study 2 was designed as an online survey of former and current volunteers as well as non-volunteers, termed 'potential volunteers', mainly in environmental volunteering but also in other types of volunteering for comparison purposes (appendix VI for current environmental volunteer survey). Respondents named the main organisation they volunteered for and answered most questions with regard to their activities for that organisation.

2.3.4.1 Volunteer survey participants

A total of 677 responses were received which after data cleaning resulted in 510 valid responses. Of these 510 responses, 324 were complete in all focus areas (motivation, motivational benefits, well-being and conservation outcomes), with the remaining 186 responses being incomplete in one or more focus areas. Only complete datasets were used within each focus area and are described in the relevant chapters. The complete sample of 510 responses comprised 54% females and 46% males (Table 2.8). Age ranged from 18 to 94 years old (mean=55.24, *SD*=16.04). Most respondents had at least one university degree (64%) and many respondents were retired (49.5%), some were working full-time (20.4%) or part-time (13.3%) and few were students (6.7%). Respondents were from 13 different countries, with the majority residing in the United Kingdom (87.7%). Volunteers named 133 different organisations they previously or currently volunteer for or would like to volunteer with in the future (appendix VIII).

Table 2.8. Study 2: Demographic data of respondents to the online volunteer survey, complete sample (n = 510).

Variable		Total sample
Age, mean		55.24 (*SD*=16.04)
Gender		
	Female	54.06%
	Male	45.74%
	Undisclosed	0.20%
Education		
	Doctoral degree	5.74%
	Master degree	24.36%
	First degree (Bachelor)	34.26%
	Trade/technical/vocational qualification	15.84%
	Left school at 18 (e.g., A levels)	8.32%
	Left school at 16 (e.g. GCSE/O levels)	11.29%
	Undisclosed	0.20%
Employment		
	Retired	49.50%
	Full-time employment	20.40%
	Part-time employment	13.27%
	Student	6.73%
	Not currently employed	5.35%
	Homemaker	1.19%
	Other	3.56%
Country of residence		
	United Kingdom	87.72%
	United States	4.36%
	Denmark	2.57%
	Greece	1.39%
	Australia	0.99%
	Canada	0.79%
	France	0.40%
	Italy	0.40%
	Germany	0.20%
	Iceland	0.20%
	Czech Republic	0.20%
	Lao People's Democratic Republic	0.20%
	Norway	0.20%
	Undisclosed	0.40%

Respondents included people from three different periods: former volunteers (20%), current volunteers (67%) and potential future volunteers (13%) (Table 2.9). They were grouped into four types of volunteers: biodiversity monitoring volunteers (BM; 21%), practical conservation volunteers (PC; 34%), biodiversity monitoring volunteers also doing practical conservation (BMPC; 26%) and other types of volunteering (Other, 18%).

Table 2.9. Study 2: Type of volunteers and volunteer periods of respondents (n=510). BM: Biodiversity monitoring volunteers. PC: Practical conservation volunteers. BMPC: Biodiversity monitoring volunteers also doing practical conservation work.

	Former volunteers	Current volunteers	Potential volunteers	*Total*
BM	4.31%	14.90%	1.76%	*20.98%*
BMPC	4.31%	16.47%	5.29%	*26.08%*
PC	7.25%	22.94%	3.33%	*33.53%*
Other	4.12%	12.35%	1.96%	*18.43%*
Undisclosed	0.00%	0.00%	0.98%	*0.98%*
Total	*20.00%*	*66.67%*	*13.33%*	*100.00%*

2.3.4.2 Volunteer survey instrument and procedure

Questionnaire. The online questionnaire included all four main elements, motivation (discussed in section 2.3.2.1), motivational benefits (discussed in section 2.3.2.2), well-being (discussed in section 2.3.2.4) and items relating to conservation output and outcomes of volunteering (discussed in section 2.3.2.5) (appendix VI for current volunteer questionnaire). Only items relevant to the respondents were displayed, e.g. questions about motivational benefits were only displayed to current and former volunteers as potential volunteers had not volunteered and therefore did not have volunteer experience to evaluate (Table 2.10).

Table 2.10. Study 2: Overview of main elements of online survey for all volunteer categories and the type of data generated.

	Former volunteers	Current volunteers	Potential volunteers
Motivation	Actual motivations remembered	Actual motivations during volunteering	Actual motivations before volunteering
Motivational benefits	Actual motivational benefits gained	Actual motivational benefits gained	*(Not applicable as had not volunteered)*
Well-being	General level of well-being	Remembered during volunteering	General level of well-being
Conservation outcomes	Perceived conservation outcomes	Perceived conservation outcomes	Expected conservation outcomes

Pilot study. A pilot study was conducted with 15 volunteers and potential volunteers to test question formulations and online layout (data not included in the final samples). Following feedback from the pilot study, only minor changes were made to the online questionnaires and layout.

Data collection. Participation in the survey was voluntary. The survey was open to anyone with the link between September and December 2015. Participating organisations from study 1 were invited to send the survey link to their volunteers. The survey link was sent out more widely through professional networks such as LinkedIn groups and email groups, social media

and to personal contacts of the researcher. Participants were offered the opportunity to win one of two £50 Amazon vouchers by completing the survey.

2.3.5 Study 3: Online volunteer manager survey

The aim of the online volunteer manager survey was to contribute to answering all four research questions. Study 3 was designed as an online survey of former and current volunteer managers as well as potential volunteer managers, mainly in environmental volunteering but also in other types of volunteering for comparison purposes (appendix VII for current environmental volunteer manager survey). Respondents named the main organisation they managed volunteers for and answered most questions with regard to their volunteer management for that organisation.

2.3.5.1 Volunteer manager survey participants

A total of 204 responses were received from volunteer managers which resulted in 136 valid responses after data cleaning. Of these 136 responses, 105 were complete in all focus areas (motivation, well-being and conservation outcome), with the remaining 31 responses being incomplete in one or more focus areas. Only complete datasets were used within each focus area and are described in the relevant chapters. The complete sample of 136 responses comprised 65% females and 33% males (Table 2.11). Age ranged from 19 to 82 years old (mean=42.15, *SD*=13.84). Most respondents had at least one university degree (82%) and most respondents were in full-time employment (68.4%), some were working part-time (14.7%) and few were retired (9.6%), students (1.5%), not currently employed (1.5%) or homemakers (0.7%). Respondents were from 13 different countries, with the majority residing in the United Kingdom (83.1%). Volunteer managers named 79 different organisations they previously or currently manage volunteers for or would like to manage volunteers for (appendix VIII).

Table 2.11. Study 3: Demographic data from online volunteer manager survey, complete sample

Variable		Total sample
Age, mean		42.15 (*SD*=13.84)
Gender		
	Female	65.44%
	Male	33.09%
	Undisclosed	1.47%
Education		
	Doctoral degree	8.09%
	Master degree	23.53%
	First degree (Bachelor)	50.74%
	Trade/technical/vocational qualification	9.56%
	Left school at 18 (e.g., A levels)	3.68%
	Left school at 16 (e.g. GCSE/O levels)	4.41%

Variable		Total sample
Employment		
	Retired	9.56%
	Full-time employment	68.38%
	Part-time employment	14.71%
	Student	1.47%
	Not currently employed	1.47%
	Homemaker	0.74%
	Other	3.68%
Country of residence		
	United Kingdom	83.09%
	United States	8.09%
	Canada	1.47%
	Australia	0.74%
	Cabo Verde	0.74%
	Costa Rica	0.74%
	Denmark	0.74%
	Greece	0.74%
	Guatemala	0.74%
	India	0.74%
	Isle of Man	0.74%
	Mozambique	0.74%
	Puerto Rico	0.74%

Similarly to volunteers, volunteer managers were divided into periods: former managers (14.0%), current managers (80.2%) and potential future managers (5.9%) (Table 2.12), as well as volunteering types: biodiversity monitoring (BM, 19.9%), practical conservation (PC, 25.7%), biodiversity monitoring also doing practical conservation (BMPC, 35.3%) and other types of volunteering (Other, 19.1%).

Table 2.12. Types of volunteering and period of volunteer managers

Types of volunteering	Former managers	Current managers	Potential future managers	*Total*
BM	0.74%	18.38%	0.74%	*19.85%*
BMPC	8.82%	22.06%	4.41%	*35.29%*
PC	2.94%	22.06%	0.74%	*25.74%*
Other	1.47%	17.65%	0.00%	*19.12%*
Total	*13.97%*	*80.15%*	*5.88%*	*100.00%*

2.3.5.2 Volunteer manager survey instrument and procedure

Questionnaire. The online questionnaire included all four main elements, motivation (discussed in section 2.3.2.1), motivational benefits (discussed in section 2.3.2.2), well-being (discussed in section 2.3.2.4) and items relating to conservation output and outcomes of

volunteering (discussed in section 2.3.2.5) (appendix VI for current volunteer manager questionnaire). Only items relevant to the respondents were displayed, e.g. questions about conservation outcomes were only displayed to current and former volunteer managers as potential volunteer managers did not have volunteer manager experience to evaluate the outcomes (Table 2.13).

Table 2.13. Study 3: Overview of main elements of online survey for all volunteer manager categories and the type of data generated.

	Current & former managers	Potential managers
Motivation	Perceived volunteer motivations	Perceived volunteer motivations
Motivational benefits	Perceived volunteer motivational benefits	Perceived volunteer motivational benefits
Well-being	Perceived volunteer well-being	Perceived volunteer well-being
Conservation outcomes	Actual conservation outcomes	*(Not applicable)*

Pilot study. A pilot study was conducted with 3 volunteer managers to test question formulations and online layout (data not included in the final samples). Following feedback from the pilot study, only minor changes were made to the online questionnaires and layout.

Data collection. Participation in the survey was voluntary. The survey was open to anyone with the link between September and December 2015. Participating organisations from study 1 were invited to send the survey link to their volunteer managers. The survey link was sent out more widely through professional networks such as LinkedIn groups and email groups, social media and to personal contacts of the researcher. Participants were offered the opportunity to win one of two £50 Amazon vouchers by completing the survey.

2.4 Data preparation and analyses

The data were cleaned by deleting any responses with no data, with only incomplete responses in all focus areas (motivation, motivational benefits, well-being and conservation outcomes) or duplicate responses. Data analyses are described as relevant in each chapter. Descriptive statistics of volunteer demographics were analysed using Microsoft Excel. All other statistical analyses were completed using RStudio v.3.2.3 (RStudio Team 2015). The nFactor package v.2.3.3 (Raiche 2010), psych package v.1.5.8 (Revelle 2016) and the GPArotation package v.2014.11-1 (Bernaards and Jennrich 2005) were used for exploratory factor analysis, the lavaan package v.0.5-20 was used for confirmatory factor analysis (Rosseel 2012) and the ggplot2 package v.2.0.0 was used to create graphs (Wickham 2009).

Chapter 3 Environmental volunteer motivation: Managers' perceptions and actual motivations of volunteers

Abstract

Most research on volunteer motivation has focused on volunteers in the social sector; however, thousands of volunteers are engaged in environmental volunteering conducting biodiversity monitoring or practical conservation work. The aim of this chapter is to explore and compare motivations for environmental volunteering with other types of volunteering and compare volunteer managers' (n=113) perceptions of their volunteers' motivations to actual volunteer (n=474) motivations. Data were obtained from online studies and analysed based on a modified version of the Volunteer Functions Inventory. Motivations based on people's values and beliefs ('value-based' motivations) as well as their desire to learn were the most important motivations for all volunteer types. Contrary to other volunteer types, environmental volunteers were highly motivated by recreational experiences, such as spending time in nature and getting fit, which their volunteer managers did not identify as more important than other motivations. Career-based motivations were consistently rated lowest of all motivations among all types of volunteers. Across all types of volunteering, managers only perceived value-based motivations as more important for their volunteers than other motivations and they rated all other motivations similarly but lower than value-based motivations. Results suggest that volunteer organisations may benefit from enhancing managers' understanding of volunteer motivations to ensure optimal volunteer engagement.

This chapter served as the basis for a published article (appendix IX).

3.1 Introduction

Millions of people worldwide spend their valuable time engaged in volunteering (Cabinet Office 2014; Corporation for National & Community Service 2014), producing benefits for themselves, organisations and causes they volunteer for and society in general (Piliavin 2003; O'Brien et al. 2010; Salamon et al. 2011; Wilson 2012; Stukas et al. 2014). Recruiting and retaining volunteers is a continuous struggle and motivating current and potential volunteers has a high priority for many organisations (Stukas et al. 2016a), making identifying volunteer motivations a key focus for organisations. Although volunteers share a similar behaviour, freely giving their time without financial gain to the mutual benefit of the cause and the volunteers themselves, they do not necessarily have the same motivations for doing so (Clary et al. 1998). Most research on volunteer motivation has focused on volunteers in the social sector (e.g. Clary et al. 1992; Esmond and Dunlop 2004; Yeung 2004); however, thousands of volunteers are engaged in environmental volunteering and may have significantly different reasons for their participation compared to non-environmental volunteers. A crucial next step after identifying volunteer motivations is to ensure that volunteer managers are aware of those motivations and know how to create volunteer experiences to meet them. So far only few studies (Liao-Troth and Dunn 1999; Anderson and Cairncross 2005)have explored how volunteer managers perceive the motivations of their volunteers and how those perceptions align with actual volunteer motivations. This chapter uses a volunteer motivation model, the Volunteer Functions Inventory (Clary et al. 1998), to first investigate motivations of former, current and potential environmental volunteers and compare them to motivations of other types of volunteers. It then explores former, current and potential volunteer managers' perceptions of the motivations of their volunteers and finally it compares these perceived motivations to the volunteers' actual motivations.

3.1.1 Volunteer motivation

Volunteer motivations have been found to differ between individuals and even differ for the same individual over time as motivations can change during the process of volunteering (Gidron 1985; Clary et al. 1992; Ryan et al. 2001; Finkelstein 2008a; Rotman et al. 2014; The Conservation Volunteers 2014). Changes in motivations over time can also be influenced by factors external to the volunteer experience such as employment status or age (Gillespie and King 1985; Musick and Wilson 2008). For example, younger people were more motivated to volunteer by their desire to gain experience and further their career than older people already in a job or retired (Okun and Schultz 2003; Musick and Wilson 2008). While motivations can change over time, often more than one motivation is important to volunteers at any one time

(Bell et al. 2008). All these influences on and changes in motivation pose challenges to researching and understanding why people volunteer.

Using models can make it easier to understand volunteer motivation, though using different models presents challenges when comparing different studies. Empirical studies have led to different models being proposed. Clary et al. (1992, 1996) proposed a six-factor model and developed the Volunteer Functions Inventory (VFI) to explain volunteer motivation. The VFI is based on the functional approach that seeks to understand how people performing the same action, such as volunteering, can be driven by different motivations (Katz 1960; Clary and Snyder 1999; Stukas et al. 2009). Clary et al. (1992, 1996) identified six functions that are important underlying reasons why people volunteer: 1) 'values', to express or act on important personal beliefs, 2) 'understanding', to learn more about the world, other people and themselves, 3) 'social', to strengthen social relationships, 4) 'protective', to reduce negative feelings or to address personal problems , 5) 'enhancement', to grow and develop psychologically and feel better about themselves, and 6) 'career', to gain career-related skills and experience (Clary et al. 1992, 1998). Other models with one, two, three or four factors for volunteer motivation have also been proposed, with studies identifying altruistic, egoistic, social, intrinsic or extrinsic factors (e.g. Gidron 1978; Smith 1981; Fitch 1987; Morrow-Howell and Mui 1989; Cnaan and Goldberg-Glen 1991; Batson et al. 2002; Yeung 2004). These different models were considered and compared by Okun et al. (1998) and their study supported the six-factor VFI model developed by Clary et al. (1992, 1998).

The VFI has been widely used to assess volunteer motivations, especially in the social service sector from which it stemmed (Clary et al. 1996, 1998; Esmond and Dunlop 2004; Finkelstein 2008b; Gage and Thapa 2012; Ho et al. 2012; do Paço et al. 2013; Brayley et al. 2014; Stukas et al. 2016a). However, the VFI has rarely been used for evaluating environmental volunteer motivations (but see Bruyere and Rappe 2007) and only recently, a new version of the VFI was proposed for environmental citizen science, the Environmental Volunteer Functions Inventory, adding the special circumstances of contributing to an atlas project and volunteering in nature to the VFI model (Wright et al. 2015).

3.1.2 Environmental volunteer motivations

Environmental volunteering can fulfil certain volunteer motivations that other types of volunteering cannot fulfil, such as providing an opportunity for people to spend time outdoors, to connect or reconnect with nature, to better understand nature or to find their own place in

nature (Gooch 2005; Dalgleish 2007; Guiney and Oberhauser 2009). Volunteering in nature can encompass many very different activities, including the five main modes: activism, education, biodiversity monitoring, practical conservation and sustainable living (Measham and Barnett 2008), all potentially fulfilling different motivations. Throughout this thesis the term 'environmental volunteering' includes only biodiversity monitoring, such as plant and animal recording, and practical conservation work, such as invasive species clearing and habitat restoration, as these are the foci of this thesis. Available studies on environmental volunteer motivation have been based on a variety of different methodologies, including grounded theory (Rotman et al. 2014), ethnographic studies (Bell et al. 2008), thematic analysis (Hobbs and White 2012) and quantitative approaches (Johnson et al. 2014), making comparisons challenging. However, categorising previous findings using the Volunteer Functions Inventory (VFI) as a model makes comparisons easier and these comparisons are presented below for volunteers conducting biodiversity monitoring and practical conservation work, respectively.

3.1.2.1 Motivations of biodiversity monitoring volunteers

Findings from previous research of biodiversity monitoring volunteers point to a clear interest in, concern for and desire to learn about the environment and a wish to contribute to science as well as spend time outdoors, all of which are motivations that fit into the 'value', 'understanding' or 'enhancement' functions of the Volunteer Functions Inventory (VFI) (Table 3.1). Slightly less frequently reported or lower rated but still significant were 'social' functions. No studies reported 'career' functions as very important for biodiversity monitoring volunteers and when 'career' motives were mentioned, it was by students or young people (e.g. Johnson et al. 2014; Rotman et al. 2014). Many biodiversity monitoring volunteers are older (40-60 years old) or retired (Pocock et al. 2015), having no need to gain experience or contacts to further their careers. Finally, no 'protective' functions were reported in any of the studies. In some reports the opportunity to make a difference especially at a local level was cited as a main motivation (Roy et al. 2012; Tweddle et al. 2012; Haklay 2015), though no empirical data were presented to support the claim and Geoghegan et al. (2016) found that helping a specific site was not an important motivation for citizen scientists.

Table 3.1. Most frequently reported or highly rated motivations of biodiversity monitoring volunteers reported in individual studies and categorised to the functions of the Volunteer Functions Inventory (VFI) (Clary et al. 1992). No studies reported 'protective' or 'career' functions as very important for the volunteers.

Function	Motivations reported	Studies
Values	Interest in wildlife, concern for the environment or wildlife conservation, wanting to help conservation of wildlife or wildlife habitat	Weston et al. 2006, Davies et al. 2011, Hobbs and White 2012, Johnson et al. 2014, Wright et al. 2015, Geoghegan et al. 2016, Martin et al. 2016
	Contribution to science and data collection	Davies et al. 2011, Hobbs and White 2012, Wright et al. 2015, Martin et al. 2016
Understanding	Desire to learn and exchange knowledge	Bell et al. 2008, Thiel et al. 2014, Martin et al. 2016
Enhancement	Opportunity to spend time in nature or outdoors	Bell et al. 2008, Johnson et al. 2014, Wright et al. 2015
	Gaining public recognition for their efforts	Thiel et al. 2014
Social	Social interactions	Bell et al. 2008
	Collectivism	Rotman et al. 2012

3.1.2.2 Motivations of volunteers in practical conservation work

Motivations related to the environment such as 'helping or improving the environment', which fit into the 'values' function of the VFI, were consistently the most highly rated or frequently reported motivations for volunteers performing practical conservation work in previous studies (Grese et al. 2000; Roggenbuck et al. 2001; Ryan et al. 2001; Bruyere and Rappe 2007; Measham and Barnett 2008; O'Brien et al. 2008; Guiney and Oberhauser 2009; Wahl 2010; Bramston et al. 2011; Asah and Blahna 2012; Jacobsen et al. 2012; Chatters 2013b; The Conservation Volunteers 2014; Johnson et al. 2014). Motivations fitting into other functions of the VFI such as 'understanding' including the desire to learn more about nature (Ryan et al. 2001; Guiney and Oberhauser 2009), 'social' including community and social belonging (Bramston et al. 2011; Asah and Blahna 2012), and 'enhancement' including the feeling of doing something useful (Ryan et al. 2001) and spending time in the environment (Bruyere and Rappe 2007; Guiney 2009; Forestry Commission 2014; The Conservation Volunteers 2014) were found to be important in some studies, but not as consistently as motivations from the 'values' function. Similarly to the biodiversity monitoring volunteers, the 'career' function was often the lowest rated motivation (Bruyere and Rappe 2007; Guiney and Oberhauser 2009; Asah and Blahna 2012; Jacobsen et al. 2012; Forestry Commission 2014; Jackson 2014) and it was completely left out of some quantitative studies (Ryan et al. 2001; Bramston et al. 2011).

In some qualitative studies, 'career' was not mentioned and therefore did not appear in the findings (e.g. Hobbs and White 2012). Similarly to findings for biodiversity monitoring volunteers, the 'protective' function was not identified in any of the studies.

3.1.3 Volunteer managers' perceptions of volunteer motivations

Published volunteer motivation research has focused almost entirely on exploring the motivations of volunteers; however, volunteer managers' perceptions of the motivations of their volunteers are important for how they manage and interact with their volunteers (Liao-Troth and Dunn 1999). In a pilot study in the human services sector, Liao-Troth and Dunn (1999) found that volunteer managers assigned similar importance to altruistic motivations as their volunteers and made sense of their surroundings in similar ways to their volunteers. In two regional tourism case studies using the Volunteer Functions Inventory, Anderson and Cairncross (2005) also found that one volunteer manager perceived volunteers' motivational factors similarly to the volunteers, whereas the other manager's perception of his volunteers' motivations did not align with the volunteers' motivations. Volunteer managers' perceptions of their volunteers' motivations within environmental volunteering have not been investigated. Volunteer managers need to understand the motivations of their volunteers and potential new volunteers as well as how they can fulfil those motivations through providing a meaningful volunteer experience. This understanding can increase the chance that these motivated people will actually engage in volunteering behaviour and continue to do so in the future (Massung et al. 2013).

3.1.4 Aim and research questions for this chapter

The aim of this chapter is to explore what motivates different types of environmental volunteers compared to non-environmental volunteers, how volunteer managers perceive the motivations of their volunteers and how this compares to volunteers' actual motivations. The research questions addressing this aim were:

1) What motivates current, former and potential volunteers in different types of environmental volunteering and how does that compare to motivations of current, former and potential non-environmental volunteers?
2) How do current, former and potential volunteer managers in environmental volunteering perceive the motivations of their volunteers and how does this compare to non-environmental volunteer managers' perceptions of the motivations of their volunteers?
3) How do volunteer managers' perceptions compare to actual volunteer motivations?

3.2 Methods

Volunteer motivations were investigated using a functional approach based on Clary et al.'s Volunteer Functions Inventory (VFI) (1992, 1998) to facilitate comparisons with previous research findings. Through an extensive literature review, motivations related specifically to environmental volunteering were identified and motivational items were adapted accordingly. Items related to 'environmental values' or similar 'societal values' were added to the original VFI to examine the importance of context-related value motivations for environmental and other volunteers, respectively. All items were scored on a 7-point (1-7) Likert scale (Likert 1932) (chapter 2, section 3.2.1 for details). The questionnaires were finalised following feedback from pilot studies (chapter 2, sections 3.4 and 3.5 for details).

Data presented in this chapter are the subset of all items related to motivation in the questionnaires from two sources: 1) the online survey of former, current and potential volunteers (appendix VI), and 2) the online survey of former, current and potential volunteer managers (appendix VII). Both surveys were open to anyone with the link for three months between September and December 2015. Environmental organisations worldwide and volunteer centres in the UK were asked to invite their volunteers and volunteer managers to participate and the surveys were also sent out more widely through professional networks and social media such as email lists and LinkedIn groups.

3.2.1 Data analyses

3.2.1.1 Deriving the motivational factors

The first step in exploring volunteer motivations was to test if the structure of volunteers' motivations and volunteer managers' perception of volunteer motivations was consistent with the Volunteer Functions Inventory (VFI) six-factor model (Clary et al. 1998). Items relating specifically to environmental or societal values were excluded for the factor analysis, as these items only had responses from subsets of participants, environmental or other volunteering, respectively.

Volunteer motivations (Figure 3.1)**:** Only complete responses were used for factor analysis (n=432). The sample was randomly split in two equally sized samples to develop (n=216) and test (n=216) the factor model. Using the development sample, the best fitting model to the data sample was determined. This model was subsequently tested to confirm it was the best fitting model using both the test sample and the combined development and test samples. This confirmed best fitting model was then used for further analyses. The first step in

determining this best fitting model was to test the factorability of the items in the development subsample with the Kaiser-Meyer-Olkin measure of sampling adequacy, recommended to be >0.60, and with Bartlett's test of sphericity, where significance indicates the data are suitable for factor analysis (Dziuban and Shirkey 1974). For the development sample, several methods were used to determine how many factors to extract, including parallel analysis, the Kaiser-Guttman criterion (counting only Eigenvalues above one, Kaiser 1960), Velicer's minimum average partial (MAP) test (Velicer 1976) and visual inspection of the scree plot for the sample (Cattell 1966). Exploratory Factor Analyses (EFA) using ordinary least squares to find the minimum residual solution with oblique (promax) rotation, allowing factors to be correlated, were performed for relevant models. To determine overall best fit model, results were evaluated using the root mean square error of approximation (RMSEA) and examined for interpretability. A RMSEA <0.05 indicate a good fit and between 0.05 and 0.08 indicate a fair fit (MacCallum et al. 1996). Cronbach's α (Cronbach 1951) was calculated for each subscale to test internal reliability of subscales. Cronbach's α values >0.70 are acceptable (Nunnally 1978). Items with factor loadings <0.4 or loading on two factors with the difference between primary and secondary loadings <0.3 were removed from the dataset before further analyses, a suggested way of dealing with inconclusive factor loadings (Matsunaga 2010). Confirmatory Factor Analysis (CFA) was then performed for the final model developed from the EFA using the test sample and the complete sample. Model fit was evaluated using RMSEA as well as the standardised root mean residual (SRMR), comparative fit index (CFI) and the Tucker Lewis Index (TLI). A SRMR <0.08 is considered a good fit, and TLI and CFI values >0.90 are considered acceptable and close to or above 0.95 are considered good fits (Hu and Bentler 1999).

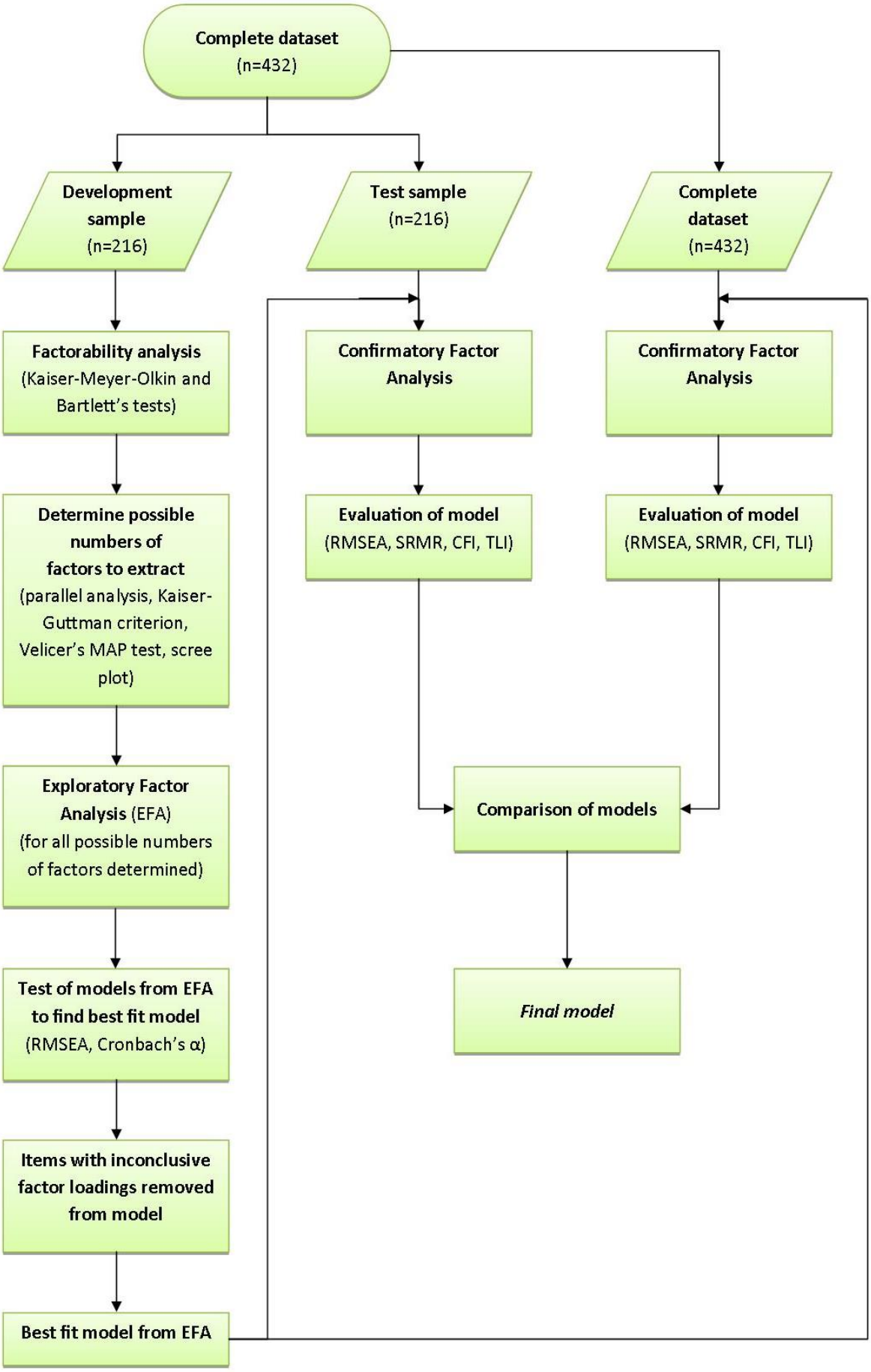


Figure 3.1. Analysis flowchart for determining the best fit model of volunteers' motivational factors.

Volunteer managers' perception of volunteer motivations (Figure 3.2)**:** Due to the limited sample size (n=109), it was not possible to split the data into a development and a test sample, as sample size should be at least 100-200 per subsample to perform the analysis (MacCallum et al. 1996). An exploratory factor analysis was performed on the complete sample, following the method described above, including testing factorability of items, determining number of factors to extract and using oblique (promax) rotation for the factor analysis. The best fit model was determined also following the described method above by evaluating RMSEA, interpretability and Cronbach's α. Items with inconclusive factor loadings were removed. CFA were performed on the volunteer manager data using the best-fitting model from the EFA and on the final model developed from the volunteer EFA described above. Model fit for both models were evaluated using RMSEA, SRMR, CFI and TLI, and models were compared for best fit.

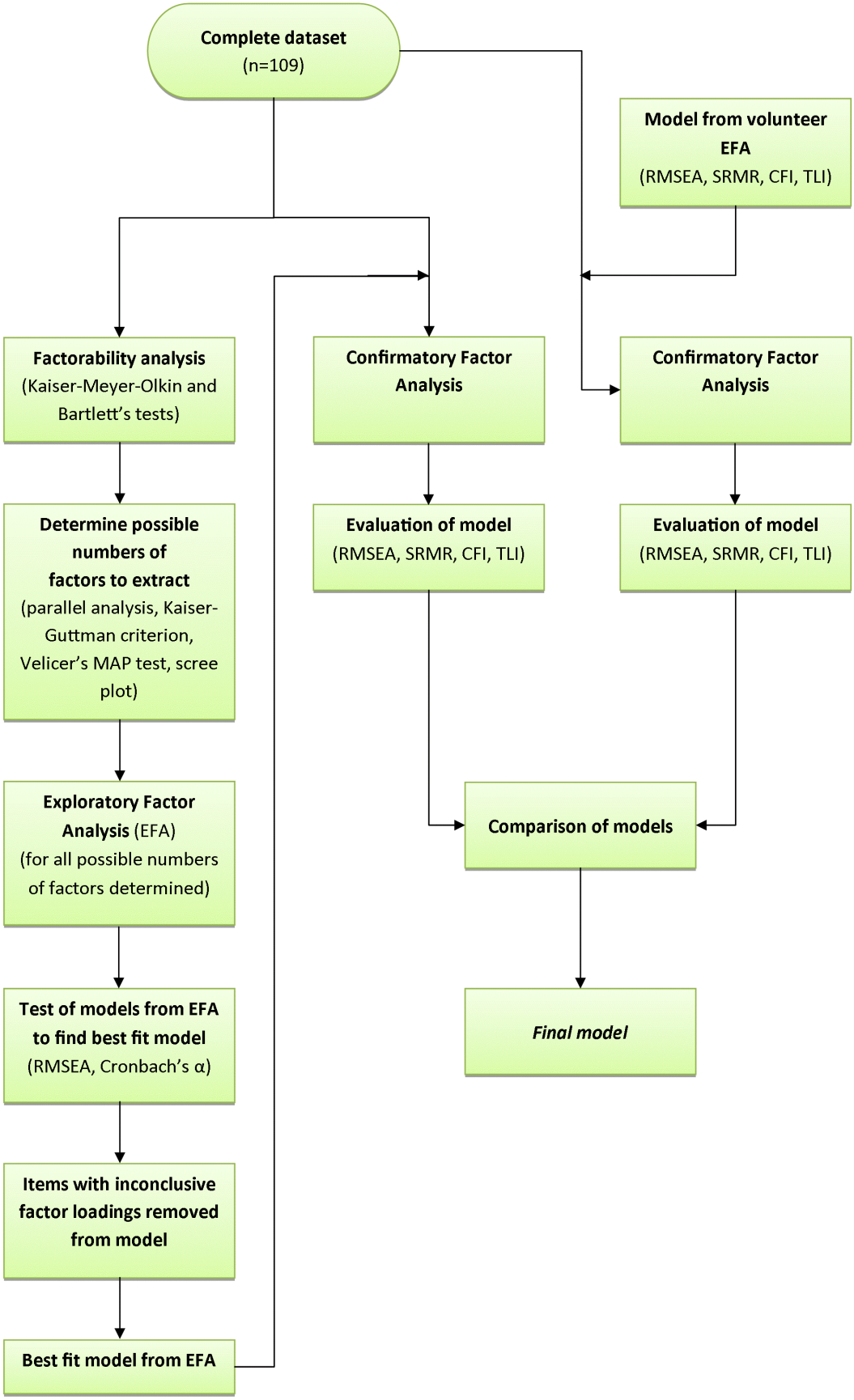


Figure 3.2. Analysis flowchart for determining the best fit model of perceived volunteer motivational factors by volunteer managers.

3.2.1.2 Influence of volunteering type, period and other variables on motivational scores

Volunteering type and period as well as demographic variables (age, gender, education, employment status, country) were included in stepwise multiple regression analyses to investigate their effect on the overall mean motivational score (MMS) of volunteers. Differences in volunteer mean scores for individual motivational items as well as identified motivational factors by type and period were explored for both volunteers and volunteer managers using Kruskal-Wallis tests. Dunn's tests with Bonferroni correction were used as post hoc tests to determine which groups were significantly different.

3.3 Results

3.3.1 Online volunteer survey

3.3.1.1 Participants

A total of 474 responses were received of which 432 were complete. The total sample comprised 54% females and 46% males. Age ranged from 18 to 84 years old (mean=54.38, *SD*=16.03). Most respondents had at least one university degree (65.61%) and many were retired (48.95%) or in full-time employment (20.89%). Respondents were from 13 different countries, with the majority residing in the United Kingdom (87.34%). Respondents named 134 different organisations they previously (43 organisations) or currently (109 organisations) volunteer for or would like to volunteer for in the future (7 organisations). Former and current volunteers volunteered on average once a week, 37 hours per month and had been volunteering for an average of 11 years. Respondents included people from three different periods: former volunteers (20%), current volunteers (67%) and potential future volunteers (13%). They were grouped into four types of volunteers: biodiversity monitoring volunteers (BM, 21%), practical conservation volunteers (PC, 34%), biodiversity monitoring volunteers also doing practical conservation volunteering (BMPC, 27%), and all other types of volunteering (Other, 18%).

3.3.1.2 Individual motivational items

Motivations for the four different types of volunteers were ranked based on item score means (following Clary et al. 1996) and the ten most important and three least important motivations were identified (Table 3.2). Five items were in the top ten for all volunteer types: 'I feel I am doing something worthwhile', 'I can learn new things', 'Volunteering is a way for me to give something back to the environment' (environmental volunteers) or '…to society' (other volunteers), 'I feel it is important to help' and 'I can do something for a cause that is important

to me'. Four of the five items relate strongly to the values of the volunteers with the last shared item, 'I can learn new things', highlighting the desire for volunteers to understand things better. A further three items were in the top ten and shared among environmental volunteer types: 'I can help to protect the environment for future generations', 'Volunteering is a way for me to contribute to environmental sustainability' and 'I enjoy spending time volunteering outdoors'. Two of these shared motivations also relate to the values of the volunteers with the last shared item, 'I enjoy spending time volunteering outdoors', highlighting the importance of recreation for environmental volunteers. 'Volunteering is fun' was also important for all volunteer types, except the biodiversity monitoring volunteers also doing practical conservation work, who had a higher focus on values. 'I can make new contacts that might help my business or career' was the only motivation shared across the bottom three for all volunteer types.

All top ten mean scores were above 5 on the 7-point Likert rating scale used, whereas the bottom three items for all volunteer types had mean scores below 3, clearly showing that individual motivation items are not equally important to volunteers. Significantly different mean scores were found between different types of volunteers for 13 of the 34 items (Kruskal-Wallis rank sum test, $p<0.05$, indicated for relevant top ten and bottom three items in Table 3.2). Where differences were found, people volunteering with both biodiversity monitoring and practical conservation consistently rated motivations higher than one or more other types of volunteers, except for one item, 'Volunteering allows me to use my skills' which was rated highest by non-environmental volunteers (Kruskal-Wallis rank sum test with post hoc Dunn's test, $p<0.05$ for all).

Table 3.2. Rank importance and means (±SD) of volunteer motivation mean item scores, top ten and bottom three listed for the four types of volunteers (n=474).

Motivational item	BM (n=99-101) (Mean ±SD)	BMPC (n=125-127) (Mean ±SD)	PC (n=154-160) (Mean ±SD)	Other (n=72-86) (Mean ±SD)
I feel I am doing something worthwhile	1 (6.04 ±1.24)	2 (6.13 ±1.04)	2 (6.12 ±0.99)	1 (6.14 ±1.23)
I can learn new things*	2 (6.03 ±1.12)	1 (6.21 ±0.92)	7 (5.77 ±1.16)	4 (5.73 ±1.42)
I feel it is important to help	5 (5.65 ±1.35)	5 (6.03 ±0.98)	8 (5.73 ±1.19)	3 (5.79 ±1.40)
Volunteering is a way for me to give something back to the environment[1] / society[2]	4 (5.67 ±1.55)	7 (6.01 ±1.26)	4 (5.92 ±1.30)	7 (5.38 ±1.82)
I can do something for a cause that is important to me	7 (5.64 ±1.49)	8 (5.93 ±1.11)	9 (5.63 ±1.22)	6 (5.53 ±1.65)

Motivational item	BM (n=99-101) (Mean ±SD)	BMPC (n=125-127) (Mean ±SD)	PC (n=154-160) (Mean ±SD)	Other (n=72-86) (Mean ±SD)
I can help to protect the environment[1] / the areas where I work (such as cultural, historical, community, etc.)[2] for future generations	3 (5.76 ±1.44)	3 (6.07 ±1.06)	6 (5.89 ±1.21)	
I enjoy spending time volunteering outdoors*	9 (5.49 ±1.65)	4 (6.06 ±1.03)	1 (6.18 ±1.04)	
Volunteering is fun	10 (5.41 ±1.49)		5 (5.90 ±0.99)	5 (5.55 ±1.55)
Volunteering is a way for me to contribute to environmental[1] sustainability / of society[2]	8 (5.63 ±1.56)	9 (5.91 ±1.17)	10 (5.55 ±1.41)	
I enjoy seeing improvements to the environment[1] / within the areas where I volunteer[2] as a result of my volunteering effort*		6 (6.02 ±1.10)	3 (5.96 ±1.13)	
I can help collect information to improve the management of the area*	6 (5.65 ±1.40)	10 (5.89 ±1.28)		
Volunteering allows me to use my skills*				2 (6.00 ±1.28)
Volunteering allows me to gain a wider perspective on the world				8 (5.27 ±1.70)
I believe I can make a difference				9 (5.27 ±1.51)
I enjoy being part of a cohesive volunteer team*				10 (5.10 ±1.82)
…				
Volunteering can help me to get my foot in the door at a place where I would like to work			32 (2.36 ±1.99)	
I can learn skills that support my career development				32 (2.48 ±2.18)
Volunteering experience will look good on my CV				33 (2.31 ±2.02)
Family and friends place a high value on volunteering	32 (2.50 ±1.59)	33 (2.61 ±1.72)		
My spiritual/religious beliefs encourage me to help	34 (2.42 ±1.97)	34 (2.48 ±2.04)	33 (2.29 ±1.79)	
I can make new contacts that might help my business or career	33 (2.48 ±2.13)	32 (2.72 ±2.23)	34 (2.27 ±1.94)	34 (2.31 ±2.04)

Note: Sample sizes vary due to some missing values for individual items. BM: Biodiversity monitoring volunteers, PC: Practical conservation volunteers, BMPC: Biodiversity monitoring volunteers also doing practical conservation. [1] Item formulation for environmental volunteers (BM, BMPC and PC). [2] Item formulation for non-environmental volunteers (Other).

* $p<0.05$.

Former, current and potential volunteers rated the importance of 11 motivations significantly differently (Kruskal-Wallis rank sum test, $p<0.05$). Former and potential volunteers rated the four 'career'-related items as more important than current volunteers (Kruskal-Wallis rank sum test with post hoc Dunn's test, $p<0.05$), though 'career'-related items were rated low in all groups. Former volunteers rated the seven other significantly different items, all relating to either 'social' or 'protective' motivations, lower than either current or potential volunteers or both (Kruskal-Wallis rank sum test with post hoc Dunn's test, $p<0.05$).

3.3.1.3 Deriving the motivational factors

Factorability of the items in the development subsample was supported by a Kaiser-Meyer-Olkin measure of 0.85 and a significant Bartlett's test of sphericity ($\chi^2(351)=3545.99$, $p<0.001$), indicating the data were fit for factor analysis. Parallel analysis suggested five factors, the Kaiser-Guttman criteria suggested six factors, Velicer's minimum average partial test identified six factors and visual inspection of the scree plot suggested five or six factors. Four-, five-, six- and seven-factor models were evaluated through Exploratory Factor Analysis in addition to Cronbach's α for individual subscales for each model. The six-factor model provided the clearest structure with an acceptable fit (RMSEA=0.070 [90% confidence interval=0.055, 0.075]). Five of the six factors could be interpreted as factors from the Volunteer Functions Inventory (VFI) (Table 3.3): 'career' (four items, α=0.97), 'protective' (four items, α=0.80), 'understanding' (three items, α=0.77), 'values' (three items, α=0.78) and 'social' (four items, α=0.75). The sixth VFI factor, Enhancement, was reduced to only two items, both reflecting a focus on the recreational aspect of volunteering and thus the factor was named 'recreation' in this research (two items, α=0.78). One VFI Enhancement item, 'Volunteering makes me feel needed', loaded on the 'protective' factor and another 'Volunteering is a way to meet new people with similar interests', loaded onto the 'social' factor. Seven items failed to load conclusively on any one factor and were left out of the confirmatory factor analysis.

Table 3.3. The six motivational factors resulting from Exploratory Factor Analysis of volunteer motivations (n=216). Cronbach's α for each subscale and items with factor loadings (only loadings <-0.30 or >0.30).

		Career	Protective	Understanding	Recreation	Values	Social
Cronbach's α		**0.97**	**0.80**	**0.77**	**0.78**	**0.78**	**0.75**
Item	**Original VFI function**						
Volunteering experience will look good on my CV	Career	0.99					
I can make new contacts that might help my business or career	Career	0.96					
I can learn skills that support my career development	Career	0.94					
Volunteering can help me to get my foot in the door at a place where I would like to work	Career	0.93					
No matter how bad I have been feeling, volunteering makes me feel better	Protective		0.80				
By volunteering I feel less lonely	Protective		0.78				
Volunteering makes me feel needed	Enhancement		0.77				
Volunteering provides an escape from all the demands of everyday life	Protective		0.61				
My spiritual/religious beliefs encourage me to help†	Values		0.39				
I can learn new things	Understanding			0.98			
Volunteering allows me to use my skills	Understanding			0.64			
Volunteering allows me to gain a wider perspective on the world	Understanding			0.54			
Volunteering is an opportunity to get practical hands-on experience†	Understanding	0.37		0.43			
I enjoy spending time volunteering outdoors	Enhancement				0.92		
By volunteering I can get exercise/better health	Enhancement				0.75		

		Career	Protective	Understanding	Recreation	Values	Social
Cronbach's α		**0.97**	**0.80**	**0.77**	**0.78**	**0.78**	**0.75**
Item	**Original VFI function**						
Volunteering allows me to spend time in a beautiful setting†	Protective		0.34		0.41		
Volunteering allows me to discover new areas/species that I did not have access to earlier†	Enhancement			0.38	0.45		
I feel it is important to help	Values					0.95	
I believe I can make a difference	Values					0.71	
I can do something for a cause that is important to me	Values					0.53	
I feel I am doing something worthwhile†	Protective		0.34			0.40	
I enjoy being part of a cohesive volunteer team	Social						0.76
Volunteering is a way to meet new people with similar interests	Enhancement						0.61
I like being part of a larger community of volunteers	Social						0.54
Family and friends place a high value on volunteering	Social						0.49
Volunteering allows me to spend time with family/friends†	Social						0.41
Volunteering is fun†	(Single item)						0.36

Note. † Items excluded from the final model due to inconclusive factor loadings and not included in the subsequent confirmatory factor analysis.

Confirmatory factor analysis (CFA) was run on the test sample (n=216) with the six-factor model developed from the EFA and according to the RMSEA, SRMR, CFI and TLI values, the six-factor model demonstrated acceptable fit (RMSEA=0.069 [90% confidence interval=0.058, 0.080], SRMR=0.060, CFI=0.939, TLI=0.925). Factor reliabilities were consistent with the development subsample except 'understanding' which was less reliable ('career' α=0.96, 'protective' α=0.83, 'understanding' α=0.70, 'recreation' α=0.80, 'values' α=0.80, 'social' α=0.78). CFA was also run on the complete sample of the combined development and test samples (n=432) and again the six-factor model demonstrated acceptable fit (RMSEA=0.064 [90% confidence interval=0.057, 0.072], SRMR=0.053, CFI=0.947, TLI=0.935) and consistent factor reliability ('career' α=0.97, 'protective' α=0.82, 'understanding' α=0.74, 'recreation' α=0.79, 'values' α=0.79 and 'social' α=0.77). Descriptive statistics and variable correlations between factors are summarised in Table 3.4 and show that all motivational factors were significantly correlated.

3.3.1.4 Age and motivation

Stepwise multiple regression reduced the model for predicting the overall mean motivational score to only include the significant variables of age ($p<0.001$) and education ($p<0.05$) as important factors ($F_{3,422}=20.33$, $p<0.001$, $R^2_{adj}=0.12$). Age was significantly negatively correlated with the overall mean motivational score (MMS), as well as with the 'values', 'understanding', 'protective' and 'career' factors (Table 3.4).

Table 3.4. Final motivational factors, descriptive statistics and correlations for volunteer respondents (n=432).

Variable	Age	MMS	V	U	R	S	P	C
Mean	42.68	4.56	5.60	5.49	5.17	4.13	4.02	2.61
SD	13.07	0.93	1.11	1.16	1.61	1.34	1.56	2.07
Min	19	1.77	1.33	1.67	1.00	1.00	1.00	1.00
Max	74	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Age	1	-0.33**	-0.12*	-0.21**	-0.04	0.01	-0.16*	-0.73**
MMS		1	0.68**	0.70**	0.56**	0.64**	0.70**	0.58**
V			1	0.50**	0.30**	0.38**	0.40**	0.24**
U				1	0.23**	0.43**	0.44**	0.40**
R					1	0.34**	0.39**	0.11*
S						1	0.56**	0.15*
P							1	0.26**
C								1

Note: MMS: Mean Motivational Score for all items, V: Value, U: Understanding, R: Recreation, S: Social, P: Protective, C: Career

*p<0.05, **p<0.001

3.3.2 Online volunteer manager survey

3.3.2.1 Participants

A total of 113 responses were received of which 105 were complete. The total sample comprised 63% females and 36% males. Age ranged from 19 to 74 years old (mean=42.68, *SD*=13.07). Most respondents had at least one university degree (81%) and most respondents were in full-time employment (69%), some were working part-time (13%) and few were retired (10%), students (2%), not currently employed (2%) or homemakers (1%). Respondents were from 11 different countries, with the majority residing in the United Kingdom (81%). Respondents identified 70 different organisations they previously (n=10) or currently (n= 58) manage volunteers for or would like to manage volunteers for in the future (n=6), 28 of these organisations corresponded to organisations volunteers also identified. Respondents included people from three different periods: former volunteer managers (12%), current volunteer managers (82%) and potential future volunteer managers (5%). They were grouped into four types of volunteering: biodiversity monitoring (BM), 19%), practical conservation volunteering (PC, 26%), biodiversity monitoring combined with practical conservation volunteering (BMPC, 37%), and all other types of volunteering (Other, 18%).

3.3.2.2 Volunteer managers' perceptions of their volunteers' individual motivational items

Perceived motivations for the four different types of volunteer managers were ranked based on item score means (following Clary et al. 1996) and the perceived ten most important and three least important motivations for volunteers were identified (Table 3.5). Six items were in top ten across all types of volunteer managers: 'Volunteers feel like they are doing something worthwhile ', 'Volunteers can do something for a cause that is important to them ', 'Volunteers believe they can make a difference ', 'Volunteers feel it is important to help', 'Volunteering is fun ' and 'Volunteers can learn new things'. Four of the six items relate strongly to 'values' and three of these value items were also shared across the top ten items in responses from all volunteer types, highlighting that volunteer managers understand that value-based reasons are among the most important motivations for volunteers. The item, 'volunteers can learn new things', was also shared across the top ten items in responses from all volunteer types as well as volunteer managers, again demonstrating that volunteer managers understand the desire their volunteers have to learn new things. One further item was in top ten and shared among environmental volunteer managers, just as it was among environmental volunteers: 'Volunteers enjoy spending time volunteering outdoors'. However, non-environmental managers scored this item in the bottom three, emphasising the difference between environmental and non-environmental volunteer managers. One item 'Volunteers' spiritual/religious beliefs encourage them to help' was consistently scored in the bottom three

across all volunteer manager types, similarly to the ratings for all environmental volunteer types.

All top ten mean scores were above 5.5 on the 7-point Likert rating scale used, whereas the bottom three items had mean scores below 4, showing that volunteer managers understand that individual motivation items are not equally important to their volunteers. Significantly different mean scores were found between managers in different types of volunteering for eight of the 34 items (Kruskal-Wallis rank sum test, $p<0.05$, indicated for relevant top ten and bottom three items per type in Table 3.5). Five of the eight items could be seen as relating mostly to the outdoors, such as volunteering in a beautiful setting or outdoors, escaping from everyday life, getting exercise or gaining access to new areas, were consistently rated significantly higher by managers in environmental volunteering than in other types of volunteering (Kruskal-Wallis rank sum test with post hoc Dunn's test, $p<0.05$ for all), a trend that was there for volunteers as well though not as consistently. Managers from different periods rated items similarly, with only one item, 'Volunteers can do something for a cause that is important to them' rated significantly different by potential (higher rating) and current (lower rating) volunteer managers (Kruskal-Wallis rank sum test with post hoc Dunn's test, $p<0.05$).

Table 3.5. Rank importance of volunteer managers' perception of volunteer motivation items, top ten and bottom three listed (n=113).

Perceived motivation item	BM (n=21-22) (Mean ±SD)	BMPC (n=38-42) (Mean ±SD)	PC (n=28-29) (Mean ±SD)	Other (n=19-20) (Mean ±SD)
Volunteers feel like they are doing something worthwhile	1 (6.55 ±0.72)	1 (6.76 ±0.53)	1 (6.55 ±0.67)	1 (6.65 ±0.65)
Volunteers can do something for a cause that is important to them	2 (6.45 ±0.72)	5 (6.21 ±0.96)	3 (6.14 ±0.86)	5 (6.21 ±1.00)
Volunteers believe they can make a difference	5 (6.32 ±0.76)	4 (6.24 ±0.84)	6 (6.07 ±0.94)	2 (6.40 ±0.80)
Volunteering is fun	3 (6.41 ±0.72)	6 (6.21 ±0.89)	4 (6.14 ±1.11)	6 (6.00 ±1.05)
Volunteers can learn new things	4 (6.41 ±0.78)	3 (6.26 ±0.87)	9 (5.97 ±1.16)	7 (6.00 ±1.14)
Volunteers feel it is important to help	8 (6.18 ±0.72)	8 (6.10 ±1.03)	7 (6.07 ±1.01)	3 (6.35 ±0.65)
Volunteers enjoy spending time volunteering outdoors*	6 (6.18 ±0.98)	10 (5.98 ±1.30)	5 (6.10 ±1.30)	
Volunteering allows people to use their skills	10 (5.95 ±0.71)		10 (5.90 ±0.80)	8 (5.95 ±1.12)

Perceived motivation item	BM (n=21-22) (Mean ±SD)	BMPC (n=38-42) (Mean ±SD)	PC (n=28-29) (Mean ±SD)	Other (n=19-20) (Mean ±SD)
Volunteers enjoy seeing improvements within the areas where they volunteer or to the environment due to their volunteering effort*		7 (6.13 ±0.92)	2 (6.29 ±1.33)	
People enjoy being part of a cohesive volunteer team			8 (6.07 ±1.17)	10 (5.85 ±1.19)
Volunteers can help to protect the environment[1] / the areas where they work (such as cultural, historical, community, etc.)[2] for future generations		2 (6.29 ±0.86)		
Volunteering makes people feel needed				4 (6.25 ±0.83)
Volunteering allows people to discover new areas/species that they did not have access to earlier*	7 (6.18 ±0.89)			
Volunteers can help collect information to improve the management of an area*	9 (6.10 ±0.97)			
Volunteering is a way for people to give something back to the environment[1] / society[2]		9 (6.05 ±0.89)		
Volunteer experience would look good on their CV				9 (5.90 ±1.45)
…				
Volunteers are excited to contribute to original scientific research*			32 (3.83 ±1.56)	
Volunteers enjoy spending time volunteering outdoors*				33 (2.50 ±1.69)
Volunteering allows people to spend time in a beautiful setting*				34 (2.40 ±1.74)
Volunteering allows people to spend time with family/friends	32 (3.36 ±1.46)	33 (3.64 ±1.57)		
Family and friends of volunteers place a high value on volunteering	33 (3.24 ±1.34)	32 (3.86 ±1.49)	33 (3.69 ±1.44)	
Volunteers' spiritual/religious beliefs encourage them to help	34 (2.59 ±1.47)	34 (3.43 ±1.97)	34 (2.72 ±1.28)	32 (3.05 ±2.01)

Note. Sample sizes vary due to some missing responses for individual items. [1] Items only presented to environmental volunteer managers (BM, BMPC and PC). [2] Items only presented to non-environmental volunteer managers (Other).

*p<0.05

3.3.2.3 Motivational factors

Factorability of the items was supported by a Kaiser-Meyer-Olkin measure of 0.80 and a significant Bartlett's test of sphericity ($\chi^2(351)=1766.57$, $p<0.001$), indicating the data were fit for factor analysis. Parallel analysis suggested five factors, the Kaiser-Guttman criteria suggested seven factors, Velicer's minimum average partial test identified five factors and visual inspection of the scree plot suggested five or six factors. Four- five-, six-, seven- and eight-factor models were evaluated through Exploratory Factor Analysis in addition to Cronbach's α for individual subscales for each model. The five-factor model provided the clearest structure, though RMSEA showed a poor fit (0.096 [90% confidence interval=0.068, 0.096]). Three of the five factors could be interpreted as factors from the Volunteer Functions Inventory (VFI) (Table 3.6): 'career' (five items, α=0.91), 'values' (four items, α=0.81) and 'protective' (two items, α=0.88). A fourth factor combined items from the VFI 'social' and 'understanding' factors, potentially because volunteer managers may see the 'understanding' items, 'volunteering allows people to use their skills' and 'volunteers can learn new things', often happening in a social context. Due to this, the factor was named 'social' (five items, α=0.79). The last factor had two items from each of the VFI enhancement and 'protective' functions and all four items had a focus on the recreational aspects of volunteering, thus the factor was named 'recreation' (four items, α=0.88). Seven items failed to load conclusively on any one factor and were therefore left out of the confirmatory factory analyses (CFA).

CFA was run on complete responses (n=105) with the 20 items that significantly loaded on the five-factor model developed from the EFA. According to the RMSEA, SRMR, FI and TLI values, the five-factor model demonstrated acceptable fit for SRMR (0.077) and poor fit for RMSEA (0.093 [90% confidence interval=0.077, 0.109]), CFI (0.876) and TLI (0.853). Descriptive statistics and variable correlations between factors are summarised in Table 3.7 and show that factors are significantly correlated, except 'career' and 'values', and 'recreation' and 'values'. CFA was also run on the complete sample to test the fit of the six-factor model developed from the volunteer sample. The six-factor model was a bad fit to the volunteer manager data (RMSEA=0.108 [90% confidence interval=0.093, 0.123], SRMR=0.089, CFI=0.831, TLI=0.792) and was therefore rejected in favour of the five-factor model.

Table 3.6. The five motivational factors resulting from Exploratory Factor Analysis of volunteer managers' perceptions of volunteer motivations (n=105). Cronbach's α for each subscale and items with factor loadings.

		Career	Social	Recreation	Values	Protective
Cronbach's α		**0.91**	**0.79**	**0.88**	**0.81**	**0.88**
Item	**Original VFI function**					
Volunteer experience would look good on their CV	Career	0.96				
Volunteering can help people to get a foot in the door at a place where they would like to work	Career	0.92				
Volunteers can learn new skills that support their career development	Career	0.89				
Volunteers can make new contacts that might help their business or career	Career	0.69				
Volunteering is an opportunity to get practical hands-on experience	Understanding	0.68				
People enjoy being part of a cohesive volunteer team	Social		0.94		-0.35	
People like to be part of a larger community of volunteers	Social		0.84			
Volunteering allows people to use their skills	Understanding		0.69			
Volunteers can learn new things	Understanding		0.55			
Family and friends of volunteers place a high value on volunteering	Social		0.48			
Volunteering allows people to gain a wider perspective on the world†	Understanding		0.52			
Volunteering is fun†	(Single item)		0.46			
Volunteers enjoy spending time volunteering outdoors	Enhancement			1.01		
Volunteering allows people to spend time in a beautiful setting	Protective			0.84		
Volunteering provides an escape from all the demands of everyday life	Protective			0.74		
By volunteering people can get exercise/better health	Enhancement			0.70		
Volunteering allows people to discover new areas/species that they did not have access to earlier†	Enhancement		0.39	0.50		
Volunteers believe they can make a difference	Values				0.83	

		Career	Social	Recreation	Values	Protective
Cronbach's α		**0.91**	**0.79**	**0.88**	**0.81**	**0.88**
Item	**Original VFI function**					
Volunteers feel like they are doing something worthwhile	Protective				0.77	
Volunteers feel it is important to help	Values				0.76	
Volunteers can do something for a cause that is important to them	Values				0.65	
By volunteering people feel less lonely	Protective					0.91
No matter how bad people have been feeling, volunteering makes them feel better	Protective					0.73
Volunteering makes people feel needed†	Enhancement				0.39	0.46
Volunteering is a way to meet new people with similar interests†	Enhancement					0.46
Volunteering allows people to spend time with family/friends†	Social			0.32		0.36
Volunteers' spiritual/religious beliefs encourage them to help†	Values					

Note. Only loadings <-0.30 or >0.30 shown in table. † Items excluded from the final model due to inconclusive factor loadings and not included in the subsequent confirmatory factor analysis.

Table 3.7. Final motivational factors, descriptive statistics and correlations for volunteer manager respondents (n=105).

Variable	Values	Recreation	Social	Protective	Career
Mean	6.32	5.16	5.39	5.28	5.29
SD	0.68	1.55	0.91	1.36	1.37
Min	4.25	1.25	2.80	1.00	1.40
Max	7.00	7.00	7.00	7.00	7.00
Values	1.00	0.19	0.29*	0.37**	0.13
Recreation		1.00	0.29*	0.37**	0.28*
Social			1.00	0.40**	0.45**
Protective				1.00	0.31*
Career					1.00

*p<0.05, **p<0.001

3.3.3 Volunteer motivations vs. volunteer managers' perceptions of volunteers' motivations

Motivational factor models differed between volunteers (six-factor model) and volunteer managers' perceptions of volunteer motivations (five-factor model), most significantly by the volunteer managers' model not including an 'understanding' factor (Table 3.8). The five common factors shared 87% of items and each pair of factors shared at least two and up to four motivational items, with 'career' being the most similar factor (four common items), followed by the 'social' and 'values' factors (three common items) and finally the 'protective' and 'recreation' factors (two common items). Each of the five common factors had one or two non-shared items.

Table 3.8. Motivational factors with related items identified by exploratory factor analysis for volunteer responses (six-factor model, n=474) and volunteer managers' responses (five-factor model, n=109).

Factor	Volunteer motivational item	Volunteer managers: perceived volunteer motivational item
Career	α=0.97, M= 2.61 (SD=2.07)	α=0.91, M= 5.29 (SD= 1.37)
	I can learn skills that support my career development	Volunteers can learn new skills that support their career development
	I can make new contacts that might help my business or career	Volunteers can make new contacts that might help their business or career
	Volunteering can help me to get my foot in the door at a place where I would like to work	Volunteering can help people to get a foot in the door at a place where they would like to work
	Volunteering experience will look good on my CV	Volunteer experience would look good on their CV
		Volunteering is an opportunity to get practical hands-on experience

Factor	Volunteer motivational item	Volunteer managers: perceived volunteer motivational item
Protective	α=0.80, Mean=4.02 (SD=1.56)	α=0.88, Mean=5.28 (SD= 1.36)
	No matter how bad I have been feeling, volunteering makes me feel better	No matter how bad people have been feeling, volunteering makes them feel better
	By volunteering I feel less lonely	By volunteering people feel less lonely
	Volunteering makes me feel needed	
	Volunteering provides an escape from all the demands of everyday life	
Recreation	α=0.78, Mean=5.17 (SD= 1.61)	α=0.88, Mean=5.16 (SD= 1.55)
	By volunteering I can get exercise/better health	By volunteering people can get exercise/better health
	I enjoy spending time volunteering outdoors	Volunteers enjoy spending time volunteering outdoors
		Volunteering allows people to spend time in a beautiful setting
		Volunteering provides an escape from all the demands of everyday life
Social	α=0.75, Mean=4.13 (SD=1.34)	α=0.79, Mean=5.39 (SD= 0.91)
	Family and friends place a high value on volunteering	Family and friends of volunteers place a high value on volunteering
	I like being part of a larger community of volunteers	People like to be part of a larger community of volunteers
	I enjoy being part of a cohesive volunteer team	People enjoy being part of a cohesive volunteer team
	Volunteering is a way to meet new people with similar interests	
		Volunteering allows people to use their skills
		Volunteers can learn new things
Values	α=0.78, Mean=5.60 (SD= 1.11)	α=0.81, Mean=6.32 (SD= 0.68)
	I feel it is important to help	Volunteers feel it is important to help
	I can do something for a cause that is important to me	Volunteers can do something for a cause that is important to them
	I believe I can make a difference	Volunteers believe they can make a difference
		Volunteers feel like they are doing something worthwhile
Understanding	α=0.77, Mean=5.49 (SD=1.16)	N/A
	I can learn new things	
	Volunteering allows me to gain a wider perspective on the world	
	Volunteering allows me to use my skills	

Motivational factors were rated differently by different types of volunteers and volunteer managers (Table 3.9 and Figure 3.3). The 'recreation' factor was rated as significantly more important by environmental volunteers and managers than by other types of volunteers and it was the only motivational factor with a significant difference in ratings between managers in different types of volunteering (Kruskal-Wallis with post hoc Dunn's test, $p<0.05$). The 'social' factor was rated as significantly more important by practical conservation volunteers and other types of volunteers than by biodiversity monitoring volunteers. Finally, the 'understanding' factor was the only factor rated significantly lower by practical conservation volunteers than by biodiversity volunteers also doing practical conservation and other volunteers.

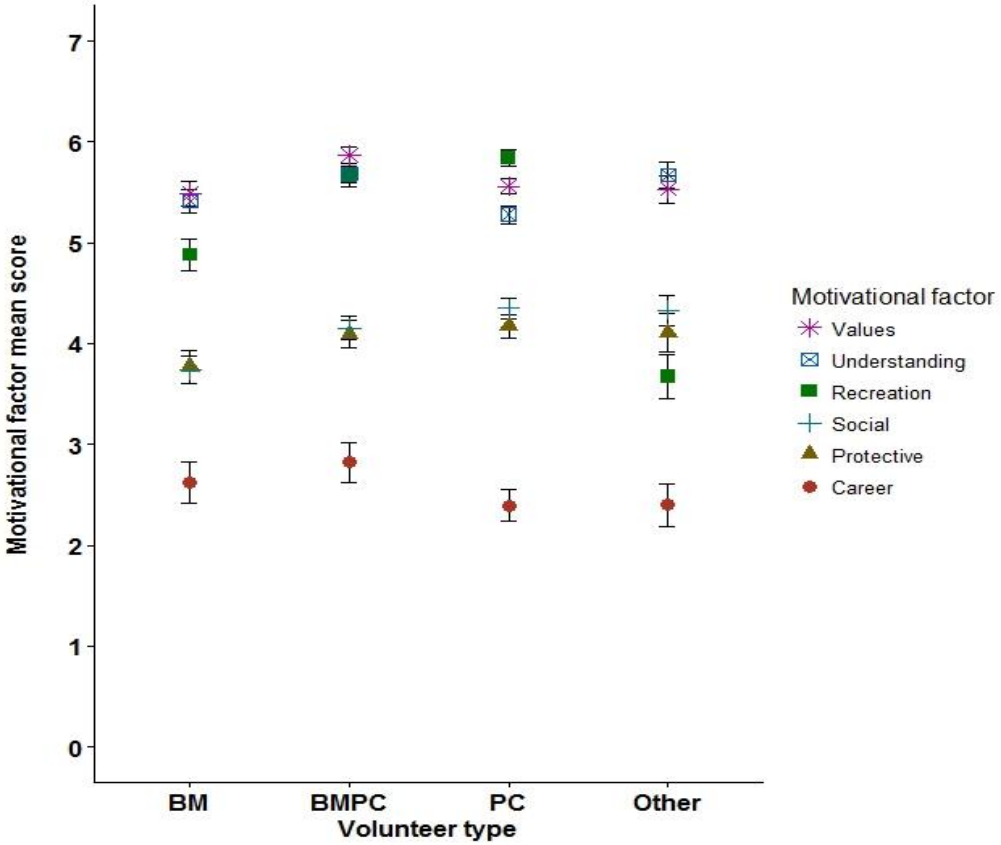
Table 3.9. Motivational factor significance by type of volunteers and volunteer managers. Only significant differences are listed (Kruskal-Wallis with post hoc Dunn's test).

Factor	Volunteers	Volunteer managers
Value	ns	ns
Understanding	BMPC=Other > PC*	N/A
Recreation	PC=BMPC > BM > Other*	PC=BM=BMPC > Other*
Social	PC=Other > BM*	ns
Protective	ns	ns
Career	ns	ns

* $p<0.05$.

The motivational factors were rated differently within the different types of volunteering by both volunteers and volunteer managers (Figure 3.3). The 'values' factor was always rated significantly higher than the 'social', 'protective' and 'career' factors by all types of volunteers and volunteer managers. For volunteers, the 'understanding' factor was also rated higher than 'social', 'protective' and 'career' factors. The 'recreation' factor was significantly more important than 'social', 'protective' and 'career' factors for environmental volunteers but not for other types of volunteers. This low rating of the 'recreation' factor by non-environmental volunteers was echoed by non-environmental volunteer managers as well.

A) Volunteers



B) Volunteer managers

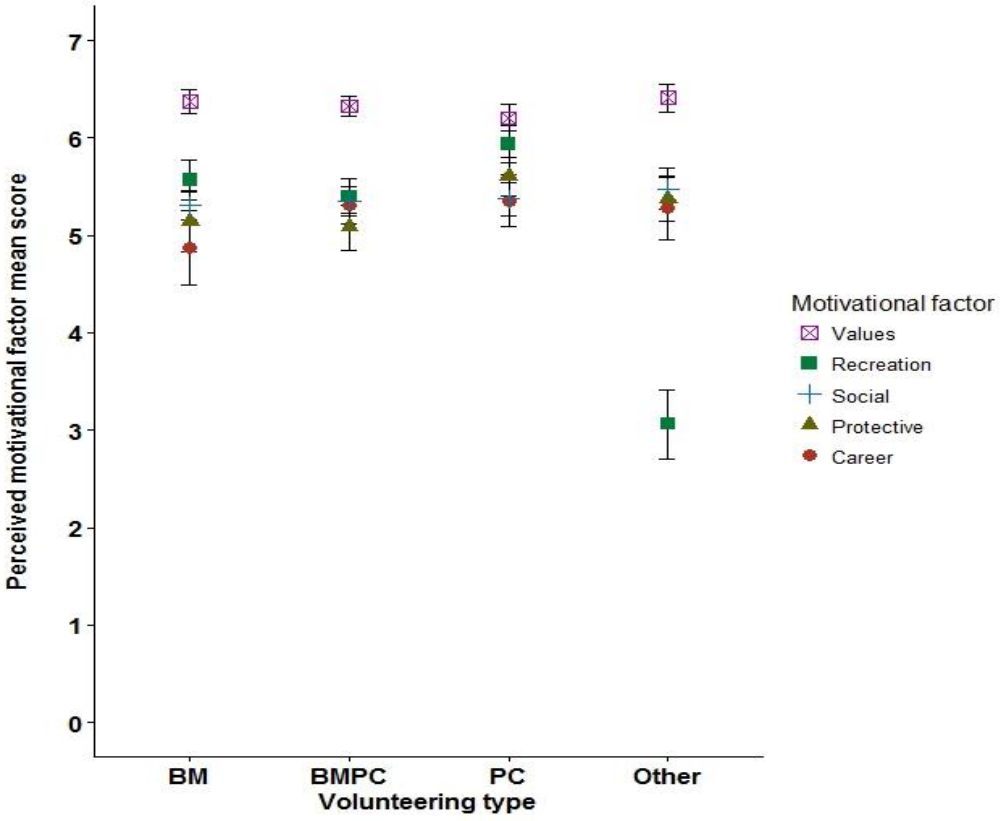


Figure 3.3. Interaction plots for effect of volunteering type and motivational factor on motivational factor mean score for A) volunteers and B) volunteer managers. BM: Biodiversity Monitoring. BMPC: Biodiversity Monitoring also doing Practical Conservation. PC: Practical Conservation. Other: all other types of volunteering (±SE bars).

Motivational factors were also rated significantly different by volunteers depending on whether they were former, current or potential future volunteers (Table 3.10 and Figure 3.4). Potential volunteers rated the 'career' and 'protective' factors as significantly more important than did current or former volunteers, respectively, whereas there was no difference in ratings for the other four factors. There were no significant differences between former, current or potential volunteer managers in their ratings of motivational factors.

Table 3.10. Motivational factor significance by period of volunteers and volunteer managers. Only significant differences (p<0.05) are listed (Kruskal-Wallis with post hoc Dunn's test).

Factor	Volunteers	Volunteer managers
Value	ns	ns
Understanding	ns	N/A
Recreation	ns	ns
Social	ns	ns
Protective	Potential=Current > Former*	ns
Career	Potential=Former > Current*	ns

*p<0.05

The motivational factors were rated differently within former, current and potential future periods of volunteering by both volunteers and volunteer managers (Kruskal-Wallis with post hoc Dunn's test, p<0.05, Figure 3.4)
). For volunteers within all volunteer periods, the 'values', 'understanding' and 'recreation' factors were significantly more important than the 'social', 'protective' and 'career' factors. For the volunteer managers, only the values function was rated as significantly higher than the 'recreation' and 'career' factors within all periods. The 'values' factor was also rated higher than the 'protective' factor by former and current managers and higher than the 'social' factor by current managers. However, there were no significant differences between any of the other factors by volunteer managers, suggesting that they perceive all other motivations as equally important if the Volunteer Functions Inventory is used as a model.

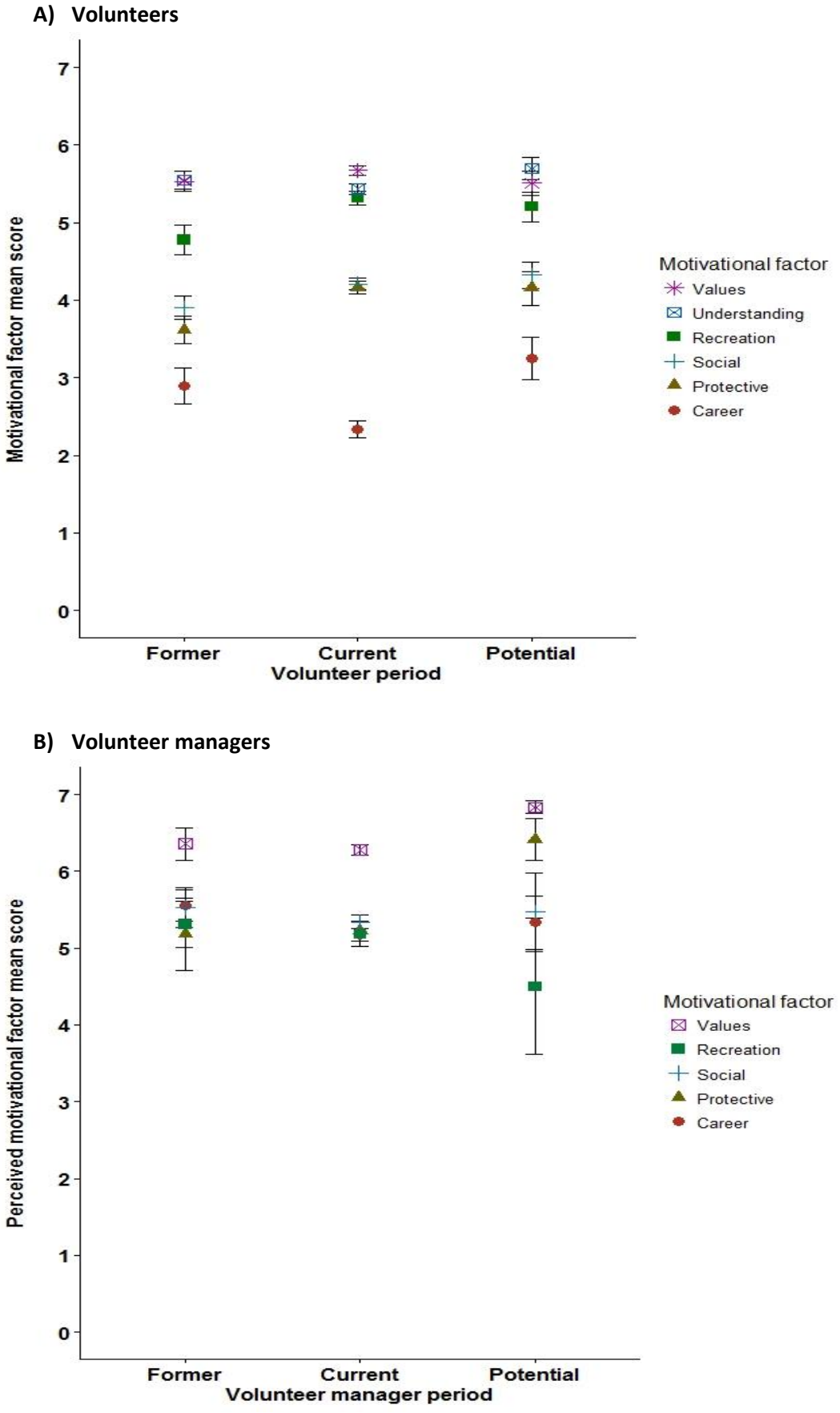


Figure 3.4. Interaction plot for effect of volunteering period and motivational factor on motivational factor mean score for A) volunteers and B) volunteer managers (±SE bars).

3.4 Discussion

Many different types of projects worldwide depend on their volunteers; understanding and addressing the motivations of those volunteers can enhance recruitment and retention (Cnaan and Goldberg-Glen 1991; Clary et al. 1992; Musick and Wilson 2008), ensure volunteer satisfaction and well-being (Stukas et al. 2016a) and enhance outcomes from volunteer activities (Clary et al. 1992; Measham and Barnett 2008). The first steps to achieving these positive outcomes of volunteering are for volunteer organisations and managers to understand the motivations the public has for getting involved in volunteering.

The fundamental motivations for volunteering appear to be similar across different volunteer types, as all types of volunteers shared five of the top ten individual motivational items in this study. Most of these shared motivational items related to value-based motivations and support the widely accepted idea that volunteering is at least partly altruistic (Smith 1981; Unger 1991). Differences in motivational item ratings were most apparent between environmental volunteers and all other types of volunteers for the five non-shared motivational items. The three different types of environmental volunteers shared most individual motivational items, most of them related to helping the environment and spending time outdoors. One motivation, 'contributing to science', is often mentioned as an important motivation in citizen science projects, which includes biodiversity monitoring projects (Davies et al. 2011; Raddick et al. 2013; Hobbs and White 2015; Wright et al. 2015); however, this motivation was not in the top ten for any environmental volunteers in this study. Instead, for the biodiversity monitoring volunteers, the importance for the use of collected data was on the more practical aspect of using the data to improve the management of the area (rated sixth), in contrast to contributing to science (rated 15th). These are important differences between biodiversity monitoring volunteers and other citizen science volunteers that managers need to be aware of and incorporate into their volunteer management, for example by providing feedback to the biodiversity monitoring volunteers on management action taken based on their contributed data.

Practical conservation volunteers in this study also enjoyed improving the area of volunteering, though through a more hands-on approach than biodiversity monitoring volunteers. 'Seeing improvements to the environment as a result of my volunteering effort' was rated third by them and as practical conservation volunteering is usually related to habitat improvement (Ryan et al. 2001; Reidy et al. 2005; O'Brien et al. 2010; Chatters 2013a), this was not a surprising finding. The ratings of these two different motivations for improving an area differentiated biodiversity monitoring volunteers from volunteers doing practical conservation;

however, volunteers doing both biodiversity monitoring and practical conservation work rated both among their top ten motivations. These volunteers also rated most individual motivational items higher than other types of environmental volunteers. Causation was not investigated in this study, but this rating could indicate that more motivated volunteers get involved in several different types of volunteering. Alternatively it could suggest that diversifying volunteer engagement and tasks may be beneficial for volunteer motivation. Conservation organisations could benefit from this by offering both practical conservation work as well as biodiversity monitoring tasks to all their volunteers. Other types of volunteers had more diverse motivations possibly due to the many different types of volunteering they were involved in. The second most important motivational item for other volunteers was 'volunteering allows me to use my skills', a motivation they rated significantly higher than environmental volunteers.

The factor analysis did identify six factors as expected from the functional motivation theory and the Volunteer Functions Inventory (VFI) (Clary et al. 1992); however, a new factor 'Recreation' was identified instead of the original enhancement factor from the VFI. This 'recreation' factor, and especially the importance of it for environmental volunteers, is consistent with previous research where a 'recreation/nature' factor was the most important factor for biodiversity monitoring volunteers (Wright et al. 2015) and a 'getting outside' factor was also identified as the third most important factor for environmental volunteers (Bruyere and Rappe 2007). This 'recreation' factor was significantly more important for environmental volunteers than for other types of volunteers and this resonates with the premise that environmental volunteering specifically provides an opportunity to spend time outdoors and gain a better understanding of nature and humans' place therein (Gooch 2005; Dalgleish 2007; Guiney and Oberhauser 2009) than other types of volunteering.

The social factor was only rated fourth among all volunteers, but was significantly less important for biodiversity monitoring volunteers than for volunteers in practical conservation and other volunteering. One potential reason for the relatively low rating of the social factor by biodiversity monitoring volunteers could be that participation in many projects is carried out alone. This individualistic setup of project participation could deter potential participants looking to meet like-minded people and join a volunteer community. To counter this, many projects have set up online fora and use social media to create virtual volunteer communities to provide opportunities for volunteers to meet each other, discuss findings and get support from the project leaders if needed. The rank ordering of volunteer motivation factors found here for both volunteering types and volunteering period, with value being the most

important, followed by 'understanding', 'recreation' (or enhancement in the original VFI), 'social', 'protective' and 'career' factors, was consistent with factor rankings found in other studies (Clary et al. 1996; Stukas et al. 2009, 2016a).

This study found two main differences between former volunteers and current and potential volunteers. Former volunteers rated the social and protective motivational items lower than current and potential volunteers. Instead of showing their actual motivations for previously volunteering, this could indicate that their social and protective motivations were not fulfilled when they did volunteer, prompting them to leave their volunteer roles. Career-based motivational items were generally rated low; however, both former volunteers and people interested in volunteering rated them as more important than current volunteers did, suggesting that some people are interested in volunteering to further their careers, but once their motivations are fulfilled they may leave the volunteer role.

Volunteer managers in this study successfully identified most of the important motivational items of their volunteers, but failed to identify many of the least important motivational items. Managers identified value-based motivational items and learning as the most important items and managers in biodiversity monitoring and practical conservation correctly identified the main motivations to improve an area as providing information to improve the management of an area and seeing improvements within an area due to volunteer efforts, respectively. However, volunteer managers failed to identify any career-based motivations as the least important motivations for their volunteers, rating instead a variety of other items perceived as least important.

The factor analysis identified only five of the proposed six factors from the Volunteer Functions Inventory (VFI) (Clary et al. 1992) as it failed to identify 'understanding' as a factor. Understanding was one of the most important motivations for volunteers and therefore a very important factor. However, two 'understanding' items loaded unto the 'social' factor, suggesting that volunteer managers perceived skills sharing and learning as part of the social cohesion in their volunteer teams, while volunteers regarded learning and using skills quite separate from and more important than social motivations. This distinction between understanding and social motivations is important for managers to recognise as volunteers may prefer opportunities for learning and using their skills that are not associated with social interactions, for example by providing learning opportunities online. Only the values factor, and for non-environmental volunteer managers the recreation factor, were rated significantly different to any other factors. The results of the factor analyses therefore suggest that

volunteer managers perceived recreation, social, protective and career factors as equally important to their volunteers, which was not the case.

Managers consistently rated motivations as more important than volunteers did, which was contrary to previous findings where two managers scored perceived volunteer motivations lower than volunteers did (Anderson and Cairncross 2005). One potential reason for this could be that volunteer managers themselves are highly motivated and that part of their job is to continually motivate their volunteers, thus perceiving their own high level of motivation as the same as their volunteers' level of motivation. The scope of this study did not include volunteer manager motivation though new research has started to address this question (e.g. Geoghegan et al. 2016).

The Volunteer Functions Inventory (VFI) (Clary et al. 1992) has been widely used to study volunteer motivation and provides a convenient model for comparison of findings from different studies. However, people wishing to study volunteer motivation using this model should ensure that the items included are relevant to the volunteer group they wish to study. A 'Recreation/nature/getting outside' factor has been found important for environmental volunteers in three separate studies (Bruyere and Rappe 2007; Wright et al. 2015 and in this study) based on the Volunteer Functions Inventory (VFI) (Clary et al. 1992) and numerous other studies (e.g. Bell et al. 2008; Guiney 2009; Johnson et al. 2014). It is a key motivation for many environmental volunteers and must be included in future instruments to measure environmental volunteer motivation, as also suggested by Wright et al. (2015) who included such a factor in their Environmental VFI. Organisations wishing to use the VFI to study the motivations of their volunteers must look at all the motivational factors to gain a better understanding of their volunteers, as the main motivation for most volunteers will be value-based as shown in this study and previous research (Clary et al. 1992; Allison et al. 2002; Stukas et al. 2016a). To distinguish their volunteer opportunity from offerings by other organisations, the focus from volunteer organisations needs to be on the other types of motivations, such as the recreational elements of environmental volunteering. This study highlights the need for volunteer organisations and managers to recognise that different motivations are not equally important to volunteers and the need to learn how to better distinguish between motivational factors, other than value-based motivations, in order to understand their volunteers better. When organisations understand and meet volunteer motivations, for example by offering training opportunities to meet the learning motivation of volunteers, they will be better able to successfully recruit and retain volunteers, ensure a high level of volunteer satisfaction and well-being and ultimately provide optimal outcomes for

their volunteers and projects (Cnaan and Goldberg-Glen 1991; Bell et al. 2008; Wright et al. 2015).

3.5 Conclusion

This chapter has shown that there are differences in motivations between types of environmental volunteers with social motivations being more important to practical conservation volunteers than to biodiversity monitoring volunteers and understanding motivations being more important to volunteers performing both biodiversity monitoring and practical conservation than volunteers only undertaking practical conservation work. A 'recreation' factor, focusing on being outdoors and gaining better health, was significantly more important for environmental volunteers than for non-environmental volunteers, clearly differentiating the two types of volunteers. Value-based motivations were the most important for former, current and potential volunteers and were perceived as such by volunteer managers in all types of volunteering. However, volunteer managers failed to distinguish between other motivational factors, rating all of them as equally important, whereas all types of volunteers clearly rated the understanding factor higher than the social, protective and career factors. Volunteer organisations can use multidimensional assessment of volunteers' motivations and managers' perception of their volunteers' motivations to identify and gain a deeper understanding of actual motivations and gaps in volunteer managers' perceptions of their volunteers' motivations. The Volunteer Functions Inventory (VFI), adapted to the specific volunteering context, could be a convenient instrument to achieve this, as it has been widely used to study volunteer motivation and thereby provides comparable benchmarks. Individual motivational items on the VFI must, however, also be examined to provide specific information on actual and perceived volunteer motivations.

Chapter 4 Environmental volunteer well-being: Managers' perceptions and actual well-being of volunteers

Abstract

Environmental volunteer well-being has rarely been compared to participant well-being associated with other types of volunteering or nature-based activities. This chapter aims to explore the immediately experienced and later remembered well-being of environmental volunteers as well as their general well-being and compare this to the well-being of participants in other similar types of nature-based activities and other types of volunteering. Furthermore, it aims to compare volunteer managers' perceptions of their volunteers' well-being with the self-reported well-being of the volunteers. Onsite surveys were conducted of practical conservation and biodiversity monitoring volunteers as well as their control groups (walkers and fieldwork students, respectively) to measure general well-being before their nature-based activity and activity-related well-being immediately after their activity. Online surveys of current, former and potential volunteers and volunteer managers measured remembered volunteering-related well-being and managers' perceptions of their volunteers' well-being. Data were analysed based on Seligman's multidimensional PERMA ('Positive emotion', 'Engagement', 'positive Relationship', 'Meaning', 'Achievement') model of well-being. Factor analysis recovered three of the five PERMA elements, 'engagement', 'relationship' and 'meaning', as well as 'negative emotion' and 'health' as factors. Environmental volunteering significantly improved positive elements and significantly decreased negative elements of participants' immediate well-being, and it did so more than walking or student fieldwork. Even remembering their volunteering up to six months later, volunteers rated their volunteering-related well-being higher than volunteers rated their well-being generally in life. However, volunteering had no effect on overall mean well-being generally in life. Volunteer managers did not perceive the significant increase in well-being that volunteers reported during volunteering. This chapter shows how environmental volunteering immediately improved participants' well-being, even more than other nature-based activities. It highlights the benefit of regarding well-being as a multidimensional construct to more systematically understand, support and enhance volunteer well-being.

This chapter has been published with minor amendments (appendix X).

4.1 Introduction

Natural environments have always been important for human well-being (Kellert and Wilson 1993; Frumkin 2001) and continue to be so as local environments become more urbanised (Kaplan 1983). One way to harness the well-being benefits of natural environments is to participate in environmental volunteering, which can increase people's connection to nature and their sense of well-being (Gooch 2005; O'Brien et al. 2010; Pillemer et al. 2010). Most research on volunteer well-being has focused on comparisons between volunteers and non-volunteers, elucidating differences in specific elements of well-being such as happiness, life satisfaction, depression or survival (Thoits and Hewitt 2001; Konrath et al. 2012; Jenkinson et al. 2013). Very few studies have addressed the questions of how volunteering immediately affects participants' well-being and how participants in different types of volunteering may gain benefits in different elements of well-being. In addition, no studies have examined how volunteer managers perceive the well-being of their volunteers and how this relates to actual volunteer well-being. This chapter uses a holistic well-being model to first explore the well-being of environmental volunteers and compare it to the well-being of participants in other similar types of nature-based activities and other types of volunteering. It then explores volunteer managers' perception of the well-being of their volunteers, and finally it compares this perceived well-being to the volunteers' self-reported well-being.

4.1.1 Volunteer well-being

Many studies have shown that volunteering is closely linked to increased well-being of volunteers (Wheeler et al. 1998; e.g. Van Willigen 2000; Wilson 2000; Thoits and Hewitt 2001; Greenfield and Marks 2004; Townsend 2006; Borgonovi 2008; Koss and Kingsley 2010; O'Brien et al. 2010; Son and Wilson 2012; Binder and Freytag 2013; Jenkinson et al. 2013; Stukas et al. 2016a). However, studies have used different definitions of well-being and have therefore measured different constructs which have often included only some aspects of well-being instead of taking a holistic approach. Two main approaches to conceptualising well-being prevail: hedonism and eudaimonia. Hedonism is the idea that maximisation of pleasure is the goal and the way to happiness for all humans, whereas eudaimonia proposes that striving to lead a meaningful life and achieve optimum functioning is the way to happiness (Ryff 1989; Diener 2000; Ryan and Deci 2001; Aristotle 2009). The two approaches have informed research into human well-being with different methods proposed for the study of well-being. Methods based on the study of 'subjective well-being' includes measures of positive affect, negative affect and life satisfaction, a mixture of both hedonic and eudaimonic well-being (Bradburn 1969; Diener 1984, 1994; Diener et al. 1999). The study of 'psychological well-being' on the other hand measures only eudaimonic elements of life, such as self-acceptance, positive

relations with others, autonomy, environmental mastery, purpose in life and personal growth, leaving out the hedonic focus on pleasures (Ryff 1989, 1995, 2014).

Though some aspects of volunteer well-being have been studied in depth, no previous studies have investigated volunteer managers' perceptions of the well-being of their volunteers. As volunteer managers are responsible for the well-being of their volunteers, and as improved volunteer well-being is often an important outcome for volunteers, organisations and society (O'Brien et al. 2011), it is vital that managers' perceptions of the well-being of their volunteers correspond to actual volunteer well-being. The cumulative evidence from a broad range of studies (see meta-analyses and reviews in Wheeler et al. 1998; Wilson 2000; Musick and Wilson 2008; Jenkinson et al. 2013) is that volunteering has a positive relationship with a wide range of elements within the concept of well-being, though causation can be difficult to determine (Greenfield and Marks 2004). Previous studies have investigated the effect of volunteering on subjective well-being (e.g. Harlow and Cantor 1996; Windsor et al. 2008; Binder and Freytag 2013) or psychological well-being (e.g. Ho 2015), or a combination of one of these along with other elements of well-being, such as social well-being, trust, self-esteem, depression or physical health (e.g. Thoits and Hewitt 2001; Greenfield and Marks 2004; Townsend 2006; Koss and Kingsley 2010; O'Brien et al. 2010; Son and Wilson 2012; Stukas et al. 2016a). Some studies show that volunteering leads to increased well-being (Piliavin and Siegl 2007; Borgonovi 2008; Piliavin 2009), while other studies show that people higher in well-being are also more likely to volunteer (Greenfield and Marks 2004; Gimenez-Nadal and Molina 2015) and to volunteer more hours (Thoits and Hewitt 2001; Son and Wilson 2012). Most likely the causality runs both ways between volunteering and well-being (Binder and Freytag 2013; Gimenez-Nadal and Molina 2015) in a "virtuous cycle" where happy and healthy people volunteer more and volunteers are happier and healthier (Brooks 2007, p. 409). Environmental volunteering could further enhance this virtuous cycle, as spending time in nature has been linked to increased well-being (Frumkin 2001).

4.1.2 Environmental volunteer well-being

Only a few studies have focused specifically on the relationship between environmental volunteers and their well-being (e.g. Townsend 2006; Koss and Kingsley 2010; O'Brien et al. 2010), as many studies have used cohort datasets where volunteering type was often heterogeneous or not described (Jenkinson et al. 2013). Volunteering in nature has been linked to well-being benefits for volunteers, including improved social networks (Gooch 2005; Bell et al. 2008; Koss and Kingsley 2010; O'Brien et al. 2010; Muirhead 2011), increased personal satisfaction and feelings of enjoyment (Koss and Kingsley 2010; Muirhead 2011) and

improved health and well-being (Koss and Kingsley 2010; O'Brien et al. 2010; Pillemer et al. 2010). Environmental volunteering can have a positive effect, not only by increasing positive indices of well-being, but also by reducing negative indices such as reducing stress (Guiney and Oberhauser 2009; O'Brien et al. 2010) and depression (Pillemer et al. 2010). Furthermore, environmental volunteering offers the added benefit of providing opportunities for volunteers to spend time in nature, which can lead to a better connection or re-connection with nature for the volunteers (Bell et al. 2008; Guiney and Oberhauser 2009). It can also lead to volunteers gaining an increased understanding of the natural environment (Koss and Kingsley 2010) and thereby also an enhanced sense of place (Evans et al. 2005; Gooch 2005). A closer connection to nature has been shown to enhance people's well-being (Kellert and Wilson 1993; Bowler et al. 2010), and therefore it could be expected that environmental volunteers would benefit more from their volunteering than other types of volunteers. Practical conservation volunteering requires stamina and physical strength and it provides a way to exercise and gain improved fitness (Guiney and Oberhauser 2009; O'Brien et al. 2010), which can also reinforce positive well-being (Pretty et al. 2005).

To better understand these relationships between volunteering and well-being, a more holistic and multidimensional approach to well-being, including both hedonic and eudaimonic elements, as well as social elements, would be well suited (Piliavin 2009). Such a holistic approach to well-being is gaining acceptance (Ryan and Deci 2001; Keyes 2002; Forgeard et al. 2011), and one proposed multidimensional model of well-being is Seligman's (2011) PERMA model. It is a construct with five contributing elements (PERMA): 1) 'Positive emotion', which encompass present positive feelings, life satisfaction and positive emotions about the future; 2) 'Engagement', which is employing one's strengths to a task, becoming fully absorbed in the task and therefore completely losing track of time, also referred to as getting into 'flow' (Csikszentmihalyi 1975, 1991; Seligman 2011); 3) 'Positive Relationships', which are fundamental to a good life according to Seligman (2011) and Baumeister and Leary (1995) have also defined it as a basic human need that is essential for well-being; 4) 'Meaning', which includes feelings of doing something worthwhile and having a purpose and direction in life something which is crucial to well-being as, according to Seligman (2011), most people have a need to belong to or serve something they believe is larger than themselves, e.g. their family, an organisation or a religious group; and 5) 'Achievement', often pursued for its own sake by individuals setting their own personal goals or striving to achieve recognition in the wider world, e.g. winning an award or accumulating wealth. Seligman (2011) did not propose a measure for his PERMA model but Butler and Kern (2016) subsequently developed the PERMA-Profiler (PERMA-P), a scale based on the PERMA model, which also includes additional

elements of well-being. The additional elements in the PERMA-P are 1) 'negative emotion' from the concept of subjective well-being acknowledging the importance of both positive and negative aspects of well-being; 2) 'health', which can be considered a core part of well-being; 3) 'loneliness', which is a strong predictor of many negative life outcomes; and 4) 'overall happiness', which allows an overall assessment after reflecting on specific elements of well-being (Butler and Kern 2016).

4.1.3 Aims and research questions for this chapter

The aim of this chapter is to explore the immediately experienced and later remembered well-being of environmental volunteers, as well as their general well-being and to compare this to the well-being of participants in other similar types of nature-based activities and other types of volunteering. It also aims to compare volunteer managers' perception of their volunteers' well-being with the self-reported well-being of the volunteers. The research questions addressing these aims were:

1) How does environmental volunteering immediately affect participants' sense of well-being and how does that compare to the immediate effect of other types of nature-based activities on participants' sense of well-being?
2) How well do volunteers sustain the memory of this immediately experienced sense of well-being after they have gone home?
3) How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers?
4) How does the volunteer managers' perceptions of volunteer well-being compare to volunteers' actual sense of volunteering-related well-being?

4.2 Methods

Well-being was investigated using a positive psychology approach based on the PERMA well-being theory proposed by Seligman (2011) and using the PERMA-Profiler (PERMA-P) developed by Butler and Kern (2016). The PERMA-P consists of the original five well-being elements proposed by Seligman, 'positive emotion' (P), 'engagement' (E), 'positive relationships' (R), 'meaning' (M) and 'achievement' (A), as well as 'negative emotion' and 'health', measured with three items each, and 'loneliness' and 'happiness', measured with a single item each. Three-item elements can be regarded as individual factors or elements and the resulting PERMA-P seven-factor model of well-being can be tested through factor analysis with the 'overall happiness' and 'loneliness' items providing additional information (Butler and Kern 2016). All items were scored by participants on an 11-point (0-10) Likert scale (Likert 1932).

Following a pilot study (detailed in chapter 2, section 2.3.3), the wording of two items on the questionnaire was changed. The two words, 'loved' and 'angry', were seen by volunteers to be 'quite American' and badly fitted to a British volunteering context and were therefore changed to 'appreciated' and 'frustrated', respectively. Data presented here are the complete subset of all items related to well-being in the questionnaires. Data were obtained from three sources: Study 1) an onsite survey of participants in nature-based activities; Study 2) an online survey of former, current and potential volunteers; and Study 3) an online survey of former and current volunteer managers (Table 4.1).

The aim of Study 1, the onsite survey, was to answer research question 1) How does environmental volunteering immediately affect participants' sense of well-being and how does that compare to the immediate effect of other types of nature-based activities on participants' sense of well-being? Combining data from Study 1 and Study 2 aimed to answer research question 2) How well do volunteers sustain the memory of this immediately experienced sense of well-being after they have gone home? The aim of Study 3, the online volunteer manager survey, was to answer research question 3) How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers? And finally, combining data from all three studies aimed to answer research question 4) How does this volunteer manager perception of volunteer well-being compare to volunteers' actual sense of volunteering-related well-being?

Table 4.1. Overview of the three studies in this research, respondents and type of well-being measured.

	Study 1: Onsite activity survey							
Respondents	Activity participants (volunteers, students and walkers)							
Focus	Before-activity				After-activity			
Type of well-being measured	Own general well-being				Own experienced activity-related well-being			
Respondent sub-groups	BM	Stud	PC	Walk	BM	Stud	PC	Walk

	Study 2: Online volunteer survey							
Respondents	Volunteers							
Focus	Current				Former and potential			
Type of well-being measured	Own remembered activity-related well-being				Own general well-being			
Respondent sub-groups	BM	BMPC	PC	Other	BM	BMPC	PC	Other

	Study 3: Online volunteer manager survey			
Respondents	Volunteer managers			
Focus	Former and current			
Type of well-being measured	Perceived volunteer well-being			
Respondent sub-groups	BM	BMPC	PC	Other

Note. BM: Biodiversity monitoring volunteers, Stud: Students conducting fieldwork as part of their university course, PC: Practical conservation volunteers, Walk: Walkers, BMPC: Biodiversity monitoring volunteers also doing practical conservation.

4.2.1 Participants

4.2.1.1 Study 1

The onsite study was conducted between October 2014 and November 2015 and involved participants from 13 organisations from Southern England, divided into four types of activities: Biodiversity monitoring, Practical conservation volunteering, Walking and Students conducting fieldwork as part of their university course (Table 4.2). Environmental organisations were invited to participate in the study based on them conducting volunteer activities in groups. Control groups were invited based on their group activity being conducted in the same natural environments as the volunteer activities of the environmental organisations. To determine if environmental volunteering had a different effect on well-being compared to other non-altruistic activities performed outdoors, students and walkers were surveyed in addition to environmental volunteers. Students were chosen as the control group to the biodiversity monitoring volunteers, as both groups were conducting ecological fieldwork in similar areas, but whereas volunteering is often seen as altruistic (Smith 1981; Unger 1991), the students did the fieldwork because it was a requirement of their university courses. The walking groups were chosen as the control group for the practical conservation volunteers as both activities were performed outdoors in similar areas and were somewhat physically demanding, but the purpose of the activities were again different, with volunteering being partly altruistic and walking only benefitting the walkers themselves. Also, walking is the most popular activity in the natural environment in England (Natural England 2015) and walking programmes are promoted as health interventions to decrease negative affect and mental illness and increase well-being in participants (Marselle et al. 2014; Iwata et al. 2016). The survey was designed as a paired before-activity and after-activity survey to measure general level of well-being and experienced level of well-being during an activity, respectively. Activity participants only completed questionnaires once to ensure independent samples even if they were present at later activities where other activity participants completed questionnaires.

Table 4.2. Respondents and descriptive statistics of groups in the onsite survey (Study 1).

Activity type	$n_{general\ well\text{-}being}$	$n_{activity\ well\text{-}being}$	Number of organisa-tions	Number of sample dates	Group sizes (mean ±SD)	Hours of activity (mean ±SD)
Biodiversity monitoring	91	79	8	16	12.83 *(±6.16)*	3.71 *(±1.62)*
Students	123	109	3	6	39.20 *(±21.72)*	3.95 *(±1.20)*
Practical conservation	100	101	2	15	15.62 *(±9.52)*	4.57 *(±1.06)*
Walkers	73	62	2	10	23.70 *(±4.28)*	2.77 *(±0.79)*

4.2.1.2 Studies 2 and 3

Both online surveys were open to anyone with the link for three months between September and December 2015. Environmental organisations involved in study 1 as well as other worldwide environmental organisations and volunteer centres in the UK were contacted directly and asked to invite their volunteers and volunteer managers to participate and the surveys were also sent out more widely through professional networks. Study 2 investigated the general level of well-being of former and potential volunteers as well as the remembered level of well-being during volunteering of current volunteers. In Study 2, a total of 417 responses were received with completed questions about well-being. This sample comprised 53% females and 47% males. Age ranged from 18 to 94 years old (mean=54.86, *SD*=16.10). Most respondents had at least one university degree (65.23%) and many were retired (48.68%), some were in full-time (21.10%) or part-time (13.19%) employment and few were students (6.95%), not currently employed (5.28%) or homemakers (1.20%). Respondents were from 11 different countries, with the majority residing in the United Kingdom (88.49%). They named 118 different organisations they previously or currently volunteer for or would like to volunteer for in the future. Respondents included people from three different periods: former volunteers (18%), current volunteers (70%) and potential future volunteers (12%). They were grouped into four types of volunteers: biodiversity monitoring volunteers (BM, 21%), practical conservation volunteers (PC, 34%), biodiversity monitoring volunteers also performing practical conservation work (BMPC, 25%) and all other types of volunteers (Other, 19%) (Table 4.3).

Table 4.3. Type of volunteers and volunteer status of respondents (n=417) to the online volunteer survey (study 2).

Volunteer type	Former volunteers (%)	Current volunteers (%)	Potential volunteers (%)	*Total (%)*
Biodiversity monitoring	4.08	15.35	1.20	20.62
BMPC	3.84	17.27	4.32	25.42
Practical conservation volunteers	6.00	24.94	2.88	33.81
Other types of volunteers	4.08	12.47	2.40	18.94
Undisclosed	0.00	0.00	1.20	1.20
Total	*17.99*	*70.02*	*11.99*	*100.00*

Note. BMPC: Biodiversity monitoring volunteers also performing practical conservation work.

Study 3 investigated the perceived level of well-being of volunteers by former and current volunteer managers. A total of 96 responses were received with completed questions about well-being. This sample comprised 61% females and 39% males. Age ranged from 19 to 74 years old (mean=43.01, *SD*=13.03). Most respondents had at least one university degree (80%) and most respondents were in full-time (69%) or part-time (13%) employment, few were

retired (10%), students (2%), not currently employed (1%) or homemakers (1%). Respondents were from 10 different countries, with the majority residing in the United Kingdom (80%). Respondents included people from two different periods: former volunteer managers (14%) and current volunteer managers (86%) and they identified 62 different organisations they previously or currently manage volunteers for. They were grouped into four types of volunteering similarly to the volunteers in Study 2: biodiversity monitoring (BM, 20%), practical conservation work (PC, 26%), biodiversity monitoring also doing practical conservation work (BMPC, 35%) and all other types of volunteering (Other, 19%) (Table 4.4).

Table 4.4. Type of volunteering and volunteer manager status of respondents (n=96) to the online volunteer manager survey (study 3).

Types of volunteering	Former managers (%)	Current managers (%)	*Total (%)*
Practical conservation	2.08	23.96	*26.04*
BMPC	9.38	26.04	*35.42*
Biodiversity monitoring	0.00	19.79	*19.79*
Other types of volunteering	2.08	16.67	*18.75*
Total	*13.54*	*86.46*	*100.00*

Note. BMPC: Volunteer managers in biodiversity monitoring also performing practical conservation work.

4.2.2 Data analyses

4.2.2.1 Deriving the well-being factors

The first step in exploring well-being was to test if the structures of self-reported well-being and managers' perception of volunteer well-being were consistent with the proposed seven-factor PERMA-Profiler (PERMA-P) model (Butler and Kern 2016). This was done by performing exploratory factor analysis (EFA) on a subsample of collected data from participants to generate a best fit model. The generated model and the original seven-factor PERMA-P model were subsequently tested for best fit through confirmatory factor analysis (CFA) using the other subsample of collected data from participants and the total combined sample. EFA was also performed on the volunteer manager data sample to generate a best fit model and confirmatory factor analysis was run on the generated model, the model generated from the activity participant subsample and the original seven-factor PERMA-P model to determine the best fit model.

Self-reported well-being: Only complete responses were used for factor analysis (n=1157) (Figure 4.1). The data were split in two subsamples to develop (n=645) and test (n=512) the factor model. The development sample consisted of all onsite and online respondents to questionnaires measuring activity-related well-being, which included volunteers and control

activity participants from Study 1 ('after-activity survey') and current volunteers from Study 2. The test sample consisted of all onsite and online respondents to questionnaires measuring general well-being which included volunteers and control activity participants from Study 1 ('before-activity survey') and former and potential volunteers from Study 2. The largest subsample was used as the development sample for the EFA.

The first step in determining the best fitting model was to test the factorability of the items in the development subsample with the Kaiser-Meyer-Olkin measure of sampling adequacy, recommended to be >0.60, and with Bartlett's test of sphericity, where significance indicates the data are suitable for factor analysis (Dziuban and Shirkey 1974). The first step in EFA is to determine the number of factors to extract. There is no set formula for determining this number and it is determined by using a variety of methods and interpretation of the data (Matsunaga 2010). Several methods were used to determine the number of factors to extract, including parallel analysis (Horn 1965), the Kaiser-Guttman criterion (counting only Eigenvalues above one, Kaiser 1960), Velicer's minimum average partial (MAP) test (Velicer 1976) and visual inspection of the scree plot (Cattell 1966) for the sample. EFA using ordinary least squares to find the minimum residual (minres) solution with oblique (promax) rotation, which allows factors to be correlated, were performed for relevant models. To determine overall best fit model, results were evaluated using the root mean square error of approximation (RMSEA). A RMSEA <0.05 indicate a good fit and between 0.05 and 0.08 indicate a fair fit (MacCallum et al. 1996). Cronbach's α (Cronbach 1951) was calculated for each factor to test internal reliability of factors. Cronbach's α values >0.70 are considered acceptable (Nunnally 1978), though for scales with 6 or fewer items lower α values may be acceptable (Cortina 1993). Items with factor loadings <0.4 or loading on two factors with the difference between primary and secondary loadings <0.3 were removed from the dataset before further analyses, a suggested way of dealing with inconclusive factor loadings (Matsunaga 2010). The best factor model was determined by choosing the model with optimal model fit indices, high internal reliability of factors and best interpretability of the data. CFA is a method to test if a certain predetermined model is a good fit for a data sample. CFA was performed for the best fit model developed from the EFA, the original seven-factor PERMA-P model and a generic one-dimensional control model using the test sample and the combined development and test sample. Model fits were evaluated using RMSEA, the standardised root mean residual (SRMR), comparative fit index (CFI) and the Tucker Lewis Index (TLI), and models were compared for best fit using χ^2 difference tests. SRMR below 0.08 is considered a good fit, and TLI and CFI values >0.90 are considered acceptable and close to or above 0.95 are considered good fits (Hu and Bentler 1999).

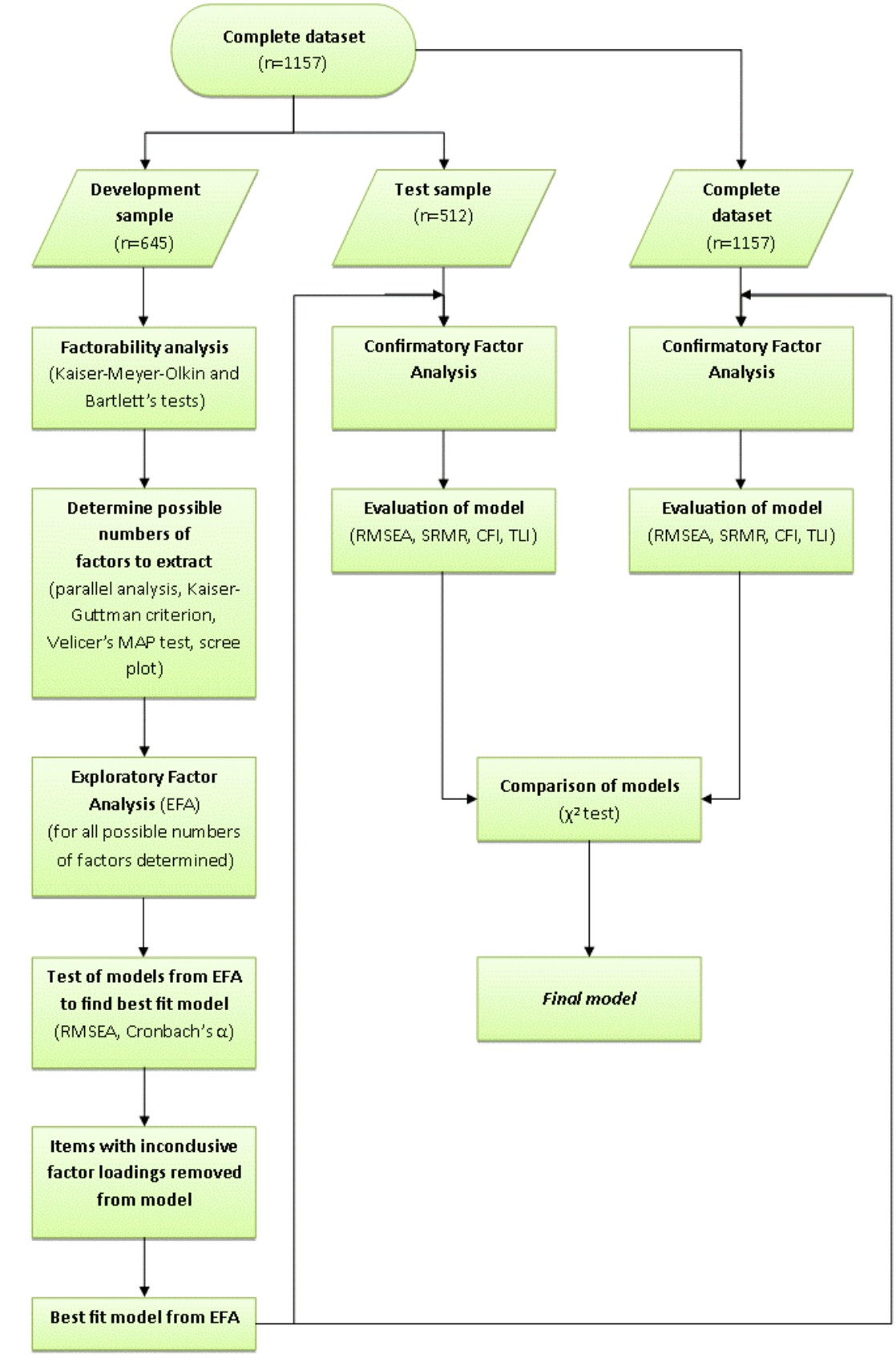


Figure 4.1. Analysis flowchart for determining the best fit model for self-reported well-being factors.

Volunteer managers' perception of volunteers' well-being: Only complete responses from former and current volunteer managers were used for factor analysis (n=96) (Figure 4.2). Due to the limited sample size, it was not possible to split the data into a development and a test sample, as sample size should be at least 100-200 per subsample to perform the analysis (MacCallum et al. 1996). EFA was performed on the complete sample, following the method described above, including testing factorability of items, determining number of factors to extract and using oblique (promax) rotation for the factor analysis. The best fit model was determined also following the described method above by evaluating RMSEA, interpretability and Cronbach's α. Items with inconclusive factor loadings were removed. CFA was then performed on the volunteer manager data sample using the best-fitting model from the EFA, the final model developed from the self-reported well-being sample EFA described above, the original seven-factor PERMA-P model and a one-dimensional control model. Model fit for all models were evaluated using the root mean square error of approximation (RMSEA), the standardised root mean residual (SRMR), comparative fit index (CFI) and the Tucker Lewis Index (TLI) and models were compared for best fit using χ^2 difference tests.

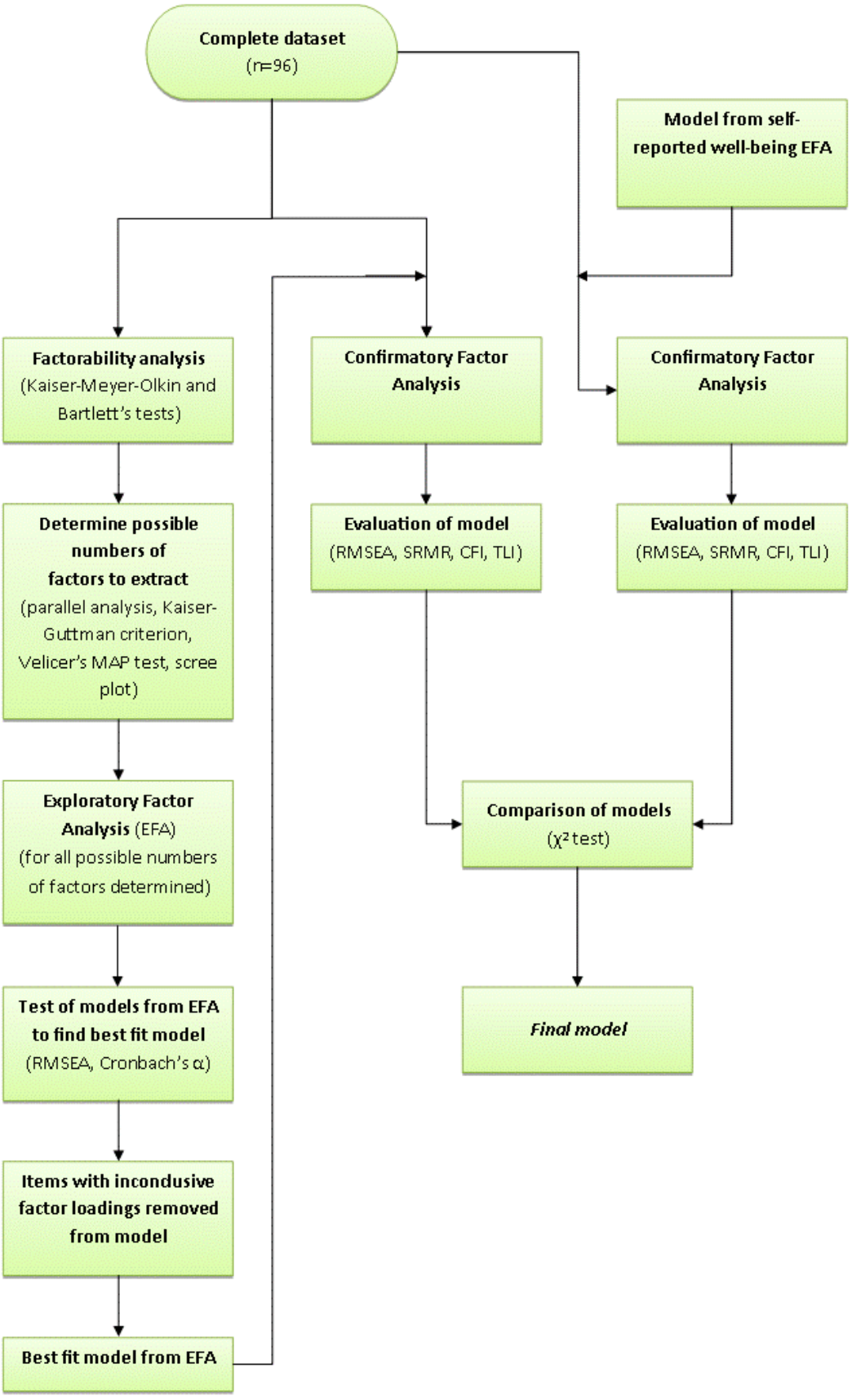


Figure 4.2. Analysis flowchart for determining the best fit model of perceived volunteer well-being factors by volunteer managers.

4.2.2.2 Influence of volunteering type and other variables on well-being scores

As data were non-normally distributed, non-parametric tests were used in all analyses. As samples in the onsite survey (Study 1) had subject replication, Wilcoxon signed-rank tests were used to test for differences in the level of general well-being and level of activity-related well-being within the four groups of activity participants. For all other comparisons in this research without subject replication, Wilcoxon rank sum tests were used to test for differences in levels between general and activity-related well-being. Kruskal-Wallis tests with post hoc Dunn's test with Bonferroni correction were used to identify significantly different levels of actual and perceived well-being between the four different types of volunteers (Studies 2 and 3) and between managers in the four different types of volunteering (Study 3), respectively.

Stepwise multiple regression was performed to examine if there were any effects of external variables on overall mean well-being, calculated as the mean of all well-being items (23 items) with negative items, i.e. negative emotions and loneliness, reverse scored. Variables included in Study 1 were volunteer frequency, tenure and hours per month volunteered, and specific variables on the day: weather, group size, hours volunteered, volunteer manager experience and type of volunteering. In Study 2, variables included were volunteering type, as well as demographic variables (age, gender, education, country). Variables included in Study 3 were volunteering type, period and manager tenure, as well as demographic variables (age, gender, education, country).

4.3 Results

4.3.1 Immediate and remembered effects of environmental volunteering, other nature-based activities and other types of volunteering (Studies 1 and 2)

4.3.1.1 Deriving the self-reported well-being factors

Factorability of the items in the development sample was supported by a Kaiser-Meyer-Olkin measure of 0.94 and a significant Bartlett's test of sphericity ($\chi^2(210)=8448.17$, $p<0.001$), indicating the data were fit for factor analysis. The number of factors to extract was determined by evaluating several factor extraction results: parallel analysis suggested six factors, the Kaiser-Guttman criteria suggested four factors, Velicer's minimum average partial test identified three factors and visual inspection of the scree plot suggested between two and five factors. Three-, four-, five- and six-factor models were evaluated through exploratory factor analysis and Cronbach's α for individual factors for each model were also evaluated. The five-factor model provided the clearest structure with a good fit (RMSEA = 0.056 [90% confidence interval = 0.048, 0.062]). The five factors could be interpreted as factors from the

PERMA-P (Table 4.5): ‘Engagement’ (four items, α = 0.79), ‘Relationships’ (three items, α = 0.77), ‘Meaning’ (two items, α = 0.88), ‘Negative emotions’ (three items, α = 0.64) and ‘Health’ (three items, α = 0.92). One ‘positive emotion’ item, ‘In general, how often do you feel joyful?’, loaded on the ‘engagement’ factor. One ‘achievement’ item, ‘How often do you achieve the important goals you have set for yourself?’ loaded on the ‘meaning’ factor, but was dropped to substantially improve internal reliability of factor and overall model fit. Five items failed to load conclusively on any one factor and were left out of the subsequent confirmatory factor analysis.

Table 4.5. The five well-being factors resulting from exploratory factor analysis of the development sample (n=645). Cronbach's α for each factor and items with factor loadings.

		Engagement	Relationship	Meaning	Negative	Health
Cronbach's α		***0.79***	***0.77***	***0.88***	***0.64***	***0.92***
Item	**Original PERMA-P factor**					
How often do you become absorbed in what you are doing?	Engagement	0.84				
In general, how often do you feel joyful?	Positive emotion	0.84				
In general, to what extent do you feel excited and interested in things?	Engagement	0.65				
How often do you lose track of time while doing something you enjoy?	Engagement	0.54				
In general, how often do you feel positive?†	Positive emotion	0.46				
How much of the time do you feel you are making progress towards accomplishing your goals?†	Achievement	0.42		0.36		
To what extent do you feel appreciated?	Relationship		1.06			
How satisfied are you with your personal relationships?	Relationship		0.86			
To what extent do you receive help and support from others when you need it?	Relationship		0.53			
In general, to what extent do you feel contented?†	Positive emotion		0.47			
To what extent do you generally feel you have a sense of direction in your life?†	Meaning		0.40	0.38		
In general, to what extent do you lead a purposeful and meaningful life?	Meaning			0.99		
In general, to what extent do you feel that what you do in your life is valuable and worthwhile?	Meaning			0.69		
How often do you achieve the important goals you have set for yourself?[1]	Achievement			0.56		
How often do you feel frustrated?	Negative emotion				0.66	
How often do you feel sad?	Negative emotion				0.63	
How often do you feel anxious?	Negative emotion				0.64	
How satisfied are you with your current physical health?	Health					0.99
In general, how would you say your health is?	Health					0.88
Compared to others of your same age and sex, how is your health?	Health					0.89
How often are you able to handle your responsibilities?†	Achievement					

Note. Only loadings <-0.30 or >0.30 shown in table. † Items excluded from the final model due to inconclusive factor loadings, and not included in the subsequent confirmatory factor analysis. [1]Item dropped to improve internal reliability of factor.

Confirmatory factor analysis (CFA) was run on the test sample and the combined development and test sample with the five-factor model developed from the EFA. Model fit was acceptable for the test sample based on all fit indices (RMSEA (0.076 [0.067; 0.085]), SRMR (0.066), CFI (0.938) and TLI (0.918)). Model fit was good for the combined development and test sample based on SRMR (0.055), CFI (0.955) and TLI (0.940) indices and was acceptable based on RMSEA (0.069 [0.064; 0.075]). The five-factor model from the EFA fitted the test sample significantly better than the original seven-factor PERMA-P model ($\Delta\chi^2(88) = 530$, $p<0.001$) or a generic one-factor model ($\Delta\chi^2(109) = 1565$, $p<0.001$). The five-factor model also fitted the combined development and test sample significantly better than the original seven-factor PERMA-P model ($\Delta\chi^2(88) = 788$, $p<0.001$) or a generic one-factor model ($\Delta\chi^2(109) = 3717$, $p<0.001$). Factor correlations based on the combined test and development sample are summarised in Table 4.6 and show that all factors were significantly correlated.

Table 4.6. Final well-being factors (1-10 scale), descriptive statistics and correlations for the combined development and test sample showing significant correlations between all factors (n=1157).

Variable	Mean	SD	Engagement	Relationship	Meaning	Negative
Engagement	7.34	1.53	1.00			
Relationship	7.55	1.74	0.52**	1.00		
Meaning	7.73	1.74	0.66**	0.63**	1.00	
Negative	2.77	2.22	-0.20**	-0.45**	-0.39**	1.00
Health	7.47	1.75	0.40**	0.44**	0.50**	-0.35**

**p<0.001

4.3.1.2 External factors and volunteer well-being

Volunteers spending more hours volunteering per month, and for study 2 also spending more time volunteering outdoors, reported higher levels of overall well-being. For the volunteers in Study 1, this result came from stepwise multiple regression, which reduced the model for predicting the overall mean volunteering-related well-being score to only include the number of hours spent volunteering per month as a significant factor ($F_{1,164} = 5.55$, $p<0.05$, $R^2 = 0.03$). For the current volunteers in Study 2, stepwise multiple regression reduced the model for predicting the overall mean volunteering-related well-being score to include the number of hours spent volunteering per month ($p<0.001$) and the amount of time spent outdoors while volunteering ($p<0.001$) as significant factors ($F_{2,225} = 11.69$, $p<0.001$, $R^2_{adj} = 0.09$). The number of hours spent volunteering per month ($r=0.22$, $p<0.001$) and the amount of time spent outdoors while volunteering ($r=0.21$, $p<0.01$) were both significantly positively correlated with the overall mean volunteering-related well-being score.

4.3.1.3 Study 1: How does environmental volunteering immediately affect well-being?

Mean well-being scores were calculated for each well-being element for both general well-being and activity-related well-being in the four participating groups: biodiversity monitoring volunteers, practical conservation volunteers, students and walkers (Table 4.7). All groups rated most of their activity-related well-being significantly better than their general well-being with the positive indices, 'engagement', 'relationship', 'meaning', 'health' and 'happiness', rated significantly higher and the negative indices, 'negative emotions' and 'loneliness', rated significantly lower for activity-related well-being than for general well-being (Wilcoxon signed-rank test, $p<0.05$ for all, Figure 4.3). The only exceptions were students' rating of 'meaning', which was not significantly different between generally in life and during their fieldwork and their rating of 'engagement', which was significantly lower for activity-related well-being than generally in life.

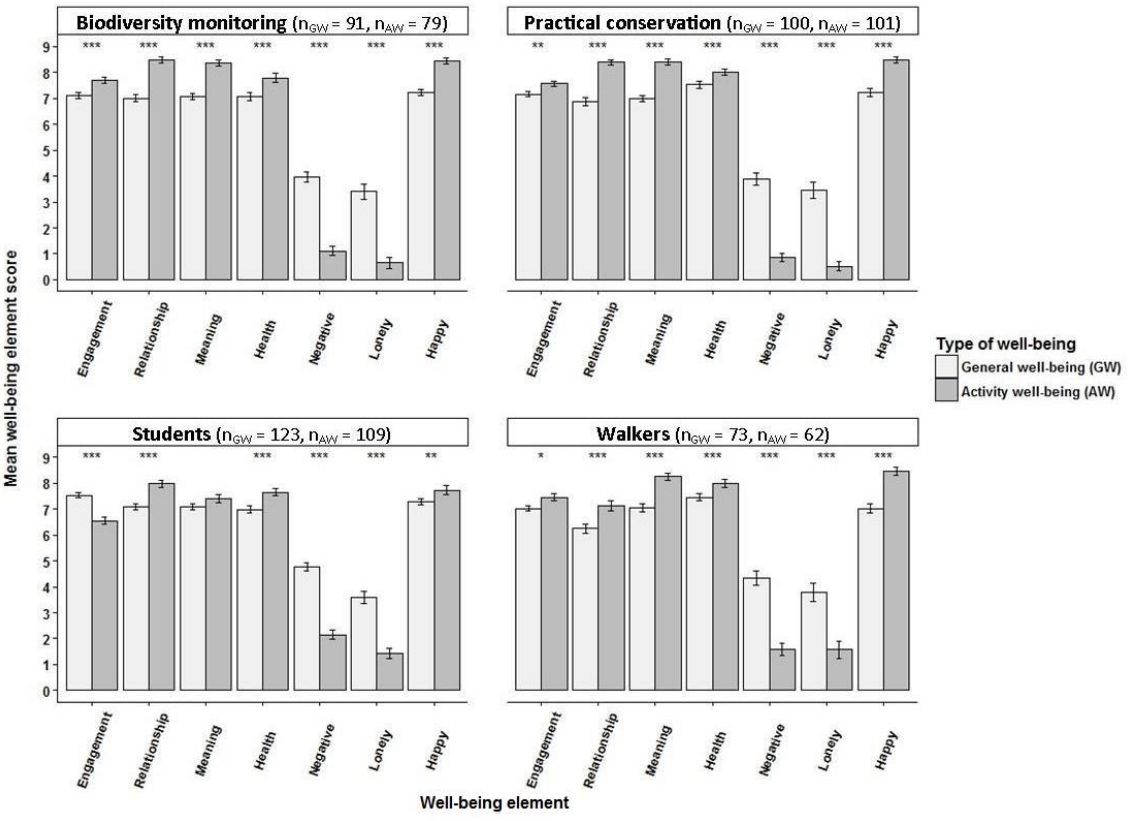


Figure 4.3. Differences between general well-being scores (light grey) and activity well-being scores (dark grey) for biodiversity monitoring volunteers, practical conservation volunteers, students and walkers (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures (Wilcoxon signed-rank tests, * p < 0.05, ** p < 0.01, *** p < 0.001).

Comparing biodiversity monitoring volunteers to their control group, the students, for general well-being there was one significant difference between volunteers and students, as volunteers rated their 'health' significantly higher than students did (Wilcoxon rank sum test, $p<0.05$, Figure 4.4). Volunteers also rated their 'negative emotions' slightly lower than students did (Wilcoxon rank sum test, $p<0.06$). When comparing their activity-related well-being, however, there were significant differences in all elements of well-being, except 'loneliness', as volunteers consistently rated positive indices significantly higher and 'negative emotions' significantly lower than students did (Wilcoxon rank sum tests, $p<0.01$ for all).

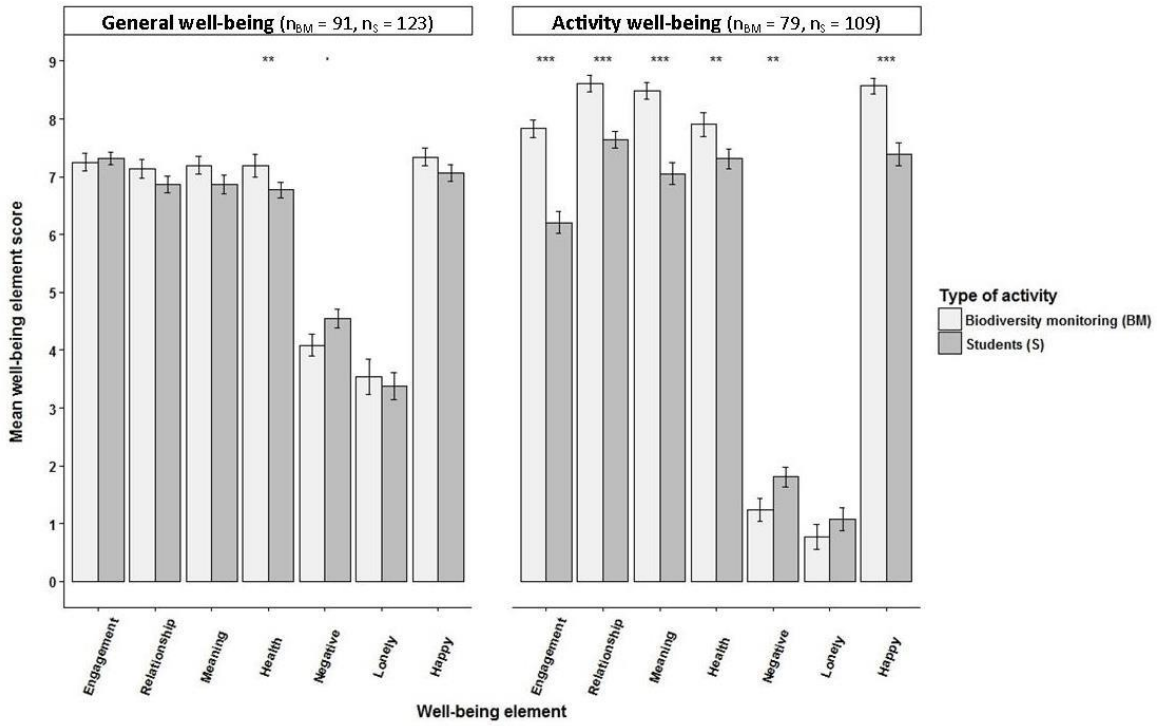


Figure 4.4. Differences between biodiversity monitoring volunteers and students in their level of general well-being (light grey) and activity well-being (dark grey) (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures (Wilcoxon rank sum test, · p < 0.06, * p < 0.05, *** p < 0.001).

Comparing practical conservation volunteers to their control group, the walkers, for their general level of well-being there was one significant difference between volunteers and walkers, as volunteers rated 'relationships' significantly higher than walkers did (Wilcoxon rank sum test, $p<0.01$, Figure 4.5). This difference in 'relationship' ratings was even more significant when comparing their activity-related well-being (Wilcoxon rank sum test, $p<0.001$). Also negative indices showed differences between volunteers and walkers for their activity-related well-being with volunteers rating their 'negative emotions' significantly lower than walkers (Wilcoxon rank sum test, $p<0.05$) and rating their 'loneliness' lower than walkers.

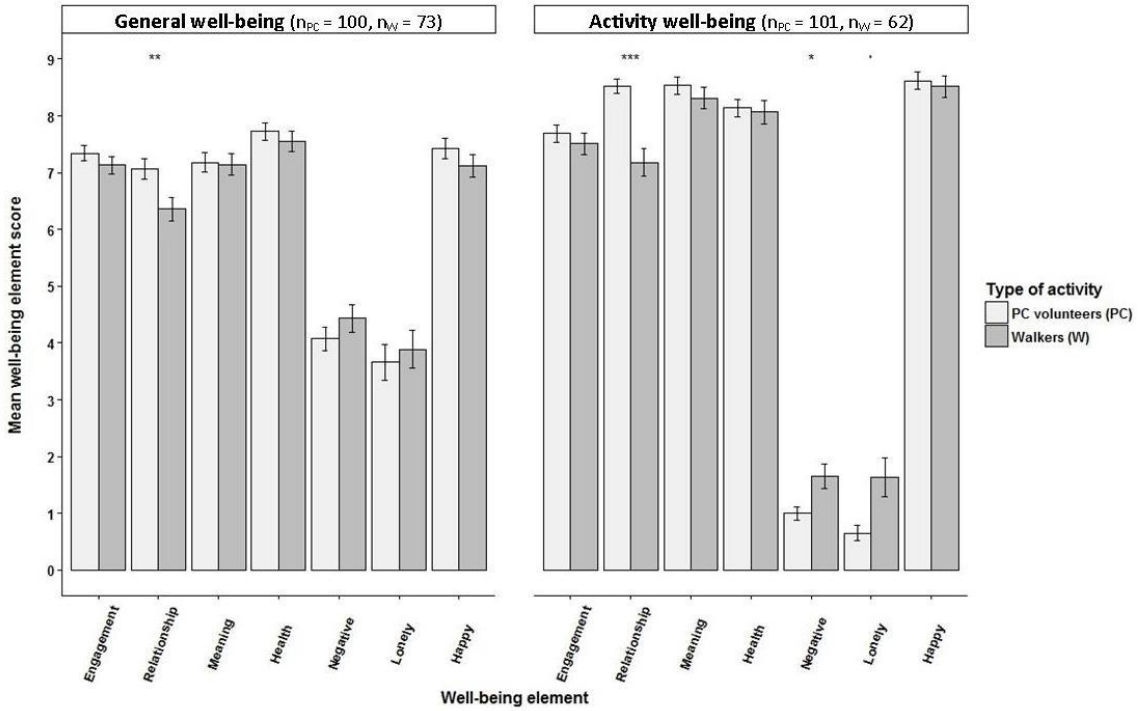


Figure 4.5. Differences between practical conservation volunteers (PC volunteers) and walkers in their level of general well-being (light grey) and activity well-being (dark grey) (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures (Wilcoxon rank sum tests, · p < 0.06, * p < 0.05, ** p < 0.01, *** p < 0.001).

Comparing the two different types of environmental volunteers, the biodiversity monitoring volunteers and the practical conservation volunteers, there were no significant differences in their levels of general (Wilcoxon rank sum tests, p>0.07 for all) or activity-related (Wilcoxon rank sum tests, p>0.30 for all) well-being, suggesting that irrespective of the type of environmental volunteering performed, the effect on well-being is equally positive (Figure 4.6).

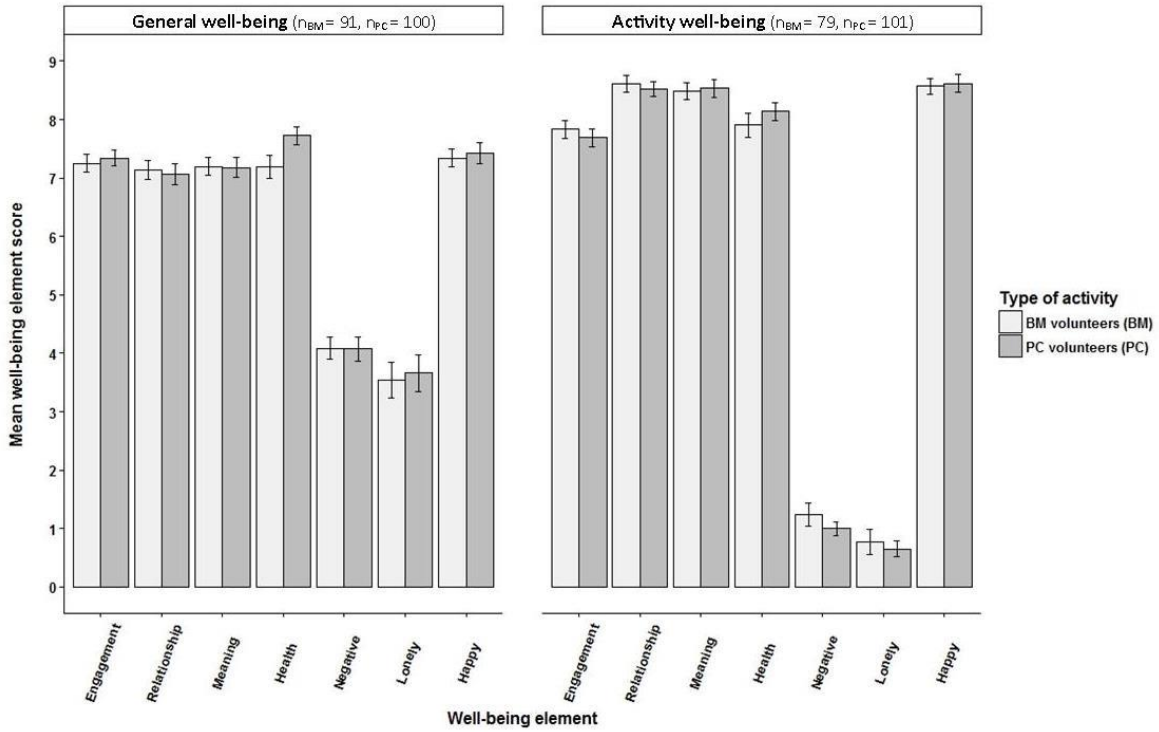


Figure 4.6. Biodiversity monitoring and practical conservation volunteers' level of general well-being (light grey) and activity-related well-being (dark grey) (±SE bars) showed no significant differences. 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures.

4.3.1.4 Study 2: How well do volunteers sustain the memory of the immediately experienced sense of well-being after they have gone home?

In the online survey, current volunteers were asked to remember the last time they volunteered and rate how they felt during that time. The 'relationship' (Kruskal-Wallis test, $\chi^2(3) = 16.18$, $p<0.01$), 'meaning' (Kruskal-Wallis test, $\chi^2(3) = 11.69$, $p<0.01$) and 'negative emotion' (Kruskal-Wallis test, $\chi^2(3) = 9.43$, $p<0.05$) elements showed significant differences between different types of volunteers (Table 4.7 and Figure 4.7). Biodiversity monitoring volunteers consistently rated positive indices lower than any other types of volunteers, and significantly so the 'relationship' element compared to biodiversity monitoring volunteers also doing practical conservation work (Dunn's test, $z = -3.44$, $p<0.01$) and non-environmental volunteers (Dunn's test, $z = -3.46$, $p<0.01$), and the 'meaning' element compared to non-environmental volunteers (Dunn's test, $z = -3.12$, $p<0.01$). Also practical conservation volunteers rated 'meaning' significantly lower than non-environmental volunteers (Dunn's test, $z = 2.67$, $p<0.05$). For 'negative emotions', however, both practical conservation volunteers (Dunn's test, $z = 2.95$, $p<0.01$) and biodiversity monitoring volunteers also doing practical conservation (Dunn's test, $z = -2.48$, $p<0.05$) also rated them significantly lower than non-environmental volunteers.

Table 4.7. Means (and SD) for well-being elements for all groups of participants and all types of well-being in all three studies in this research.

		Study 1 (onsite, paired observations)		Study 2 (online, unpaired observations)		Study 3 (online, managers)
Well-being element	**Group**	**General well-being**	**Experienced activity-related well-being**	**General well-being**	**Remembered volunteer-related well-being**	**Perceived volunteer well-being**
Engagement						
	Students	7.32 (1.12)	6.21 (1.98)			
	Walkers	7.13 (1.29)	7.51 (1.47)			
	BM	7.25 (1.45)	7.83 (1.32)	7.33 (1.56)	7.14 (1.74)	7.50 (1.27)
	PC	7.34 (1.33)	7.69 (1.52)	7.61 (1.33)	7.53 (1.46)	7.73 (1.10)
	BMPC			7.21 (1.59)	7.97 (1.15)	7.64 (1.22)
	Other			7.46 (1.20)	7.61 (1.49)	7.07 (1.85)
Relationship						
	Students	6.88 (1.59)	7.63 (1.50)			
	Walkers	6.36 (1.80)	7.18 (1.87)			
	BM	7.14 (1.58)	8.61 (1.31)	7.11 (2.17)	7.40 (1.64)	7.79 (1.34)
	PC	7.07 (1.75)	8.52 (1.30)	7.11 (2.19)	8.02 (1.35)	8.25 (0.83)
	BMPC			7.49 (1.64)	8.25 (1.59)	8.06 (1.35)
	Other			7.53 (1.78)	8.34 (1.47)	7.89 (1.77)
Meaning						
	Students	6.87 (1.73)	7.06 (2.02)			
	Walkers	7.14 (1.62)	8.31 (1.44)			
	BM	7.20 (1.48)	8.48 (1.27)	7.86 (1.37)	8.07 (1.34)	8.11 (1.08)
	PC	7.18 (1.76)	8.53 (1.58)	7.31 (1.96)	8.18 (1.51)	8.38 (1.04)
	BMPC			7.47 (1.86)	8.55 (1.11)	8.47 (1.25)
	Other			7.72 (1.75)	8.72 (1.45)	8.67 (1.04)
Health						
	Students	6.77 (1.52)	7.31 (1.73)			
	Walkers	7.55 (1.55)	8.06 (1.57)			
	BM	7.19 (1.84)	7.90 (1.89)	6.97 (1.90)	7.37 (1.57)	6.42 (1.63)
	PC	7.72 (1.59)	8.14 (1.52)	7.36 (2.40)	8.00 (1.62)	6.80 (1.81)
	BMPC			7.72 (1.92)	7.81 (1.89)	7.06 (1.80)
	Other			7.10 (1.83)	7.69 (1.92)	5.33 (2.43)
Negative						
	Students	4.55 (1.74)	1.81 (1.74)			
	Walkers	4.43 (2.05)	1.65 (1.71)			
	BM	4.08 (1.80)	1.24 (1.76)	4.17 (2.19)	1.86 (1.66)	2.33 (1.27)
	PC	4.07 (2.10)	1.00 (1.21)	3.75 (1.93)	1.62 (1.36)	2.69 (1.09)
	BMPC			3.94 (2.33)	1.84 (1.78)	2.63 (1.63)
	Other			3.91 (2.26)	2.41 (1.62)	3.72 (2.00)

Well-being element	Group	Study 1 (onsite, paired observations) General well-being	Study 1 (onsite, paired observations) Experienced activity-related well-being	Study 2 (online, unpaired observations) General well-being	Study 2 (online, unpaired observations) Remembered volunteer-related well-being	Study 3 (online, managers) Perceived volunteer well-being
Lonely						
	Students	3.37 (2.60)	1.07 (2.00)			
	Walkers	3.89 (2.87)	1.63 (2.68)			
	BM	3.54 (2.83)	0.77 (1.88)	3.41 (3.21)	1.11 (1.95)	1.53 (1.82)
	PC	3.66 (3.08)	0.65 (1.41)	2.92 (3.17)	0.96 (1.68)	2.08 (1.60)
	BMPC			3.24 (2.98)	1.17 (2.24)	1.94 (2.20)
	Other			2.41 (2.87)	1.27 (2.04)	1.72 (1.97)
Happy						
	Students	7.06 (1.56)	7.39 (2.10)			
	Walkers	7.12 (1.66)	8.52 (1.48)			
	BM	7.34 (1.50)	8.57 (1.21)	7.32 (2.20)	7.98 (1.67)	7.89 (1.25)
	PC	7.42 (1.75)	8.61 (1.52)	7.62 (1.94)	8.54 (1.29)	8.36 (0.93)
	BMPC			7.47 (2.06)	8.51 (1.46)	8.09 (1.79)
	Other			7.74 (1.73)	8.54 (1.70)	7.50 (2.11)

Note. BM: biodiversity monitoring volunteers; PC: practical conservation volunteers; BMPC: biodiversity monitoring volunteers also doing practical conservation.

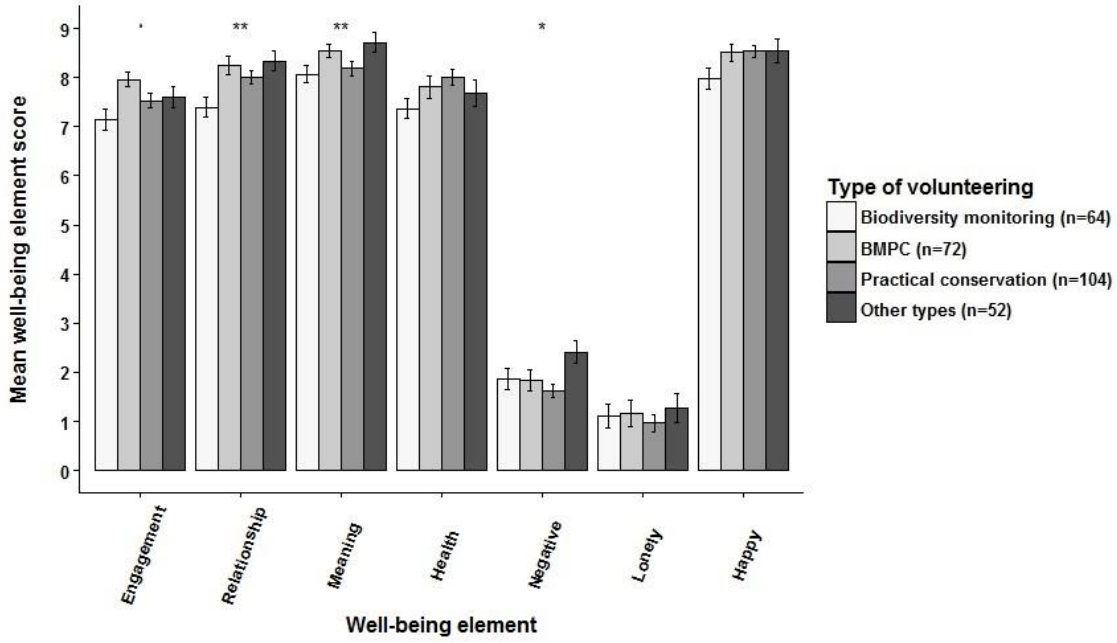


Figure 4.7. The remembered volunteering-related well-being of different types of current volunteers (±SE bars) with significant differences found for Relationship, Meaning and Negative emotions (Kruskal-Wallis tests, ˙ p<0.06, * p<0.05, ** p<0.01). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures. BMPC: Biodiversity monitoring volunteers also doing practical conservation work.

Comparison of volunteers' experienced well-being just after volunteering ended (study 1), their remembered volunteering-related well-being up to 12 months after volunteering (study 2) and their general level of well-being in life (paired data from study 1) showed that biodiversity monitoring volunteers consistently rated experienced positive indices significantly higher than their well-being generally in life (Kruskal-Wallis with post-hoc Dunn's tests, $p<0.01$ for all); remembered well-being was rated intermediate and significantly different from immediately experienced well-being for 'engagement', 'relationship' and 'health' (Kruskal-Wallis with post-hoc Dunn's tests, $p<0.01$) and significantly different from well-being generally in life for 'meaning' and 'happiness' (Kruskal-Wallis with post-hoc Dunn's tests, $p<0.01$, Table 4.7 and Figure 4.8). Practical conservation volunteers showed the same trend and also rated their experienced 'relationship', 'meaning' and 'happiness' significantly higher just after volunteering and when later remembering it compared to generally in life (Kruskal-Wallis with post-hoc Dunn's tests, $p<0.001$). Both types of volunteers rated 'negative emotions' significantly lower just after volunteering and when remembering later than generally in life (Kruskal-Wallis with post-hoc Dunn's tests, $p<0.001$ for all).

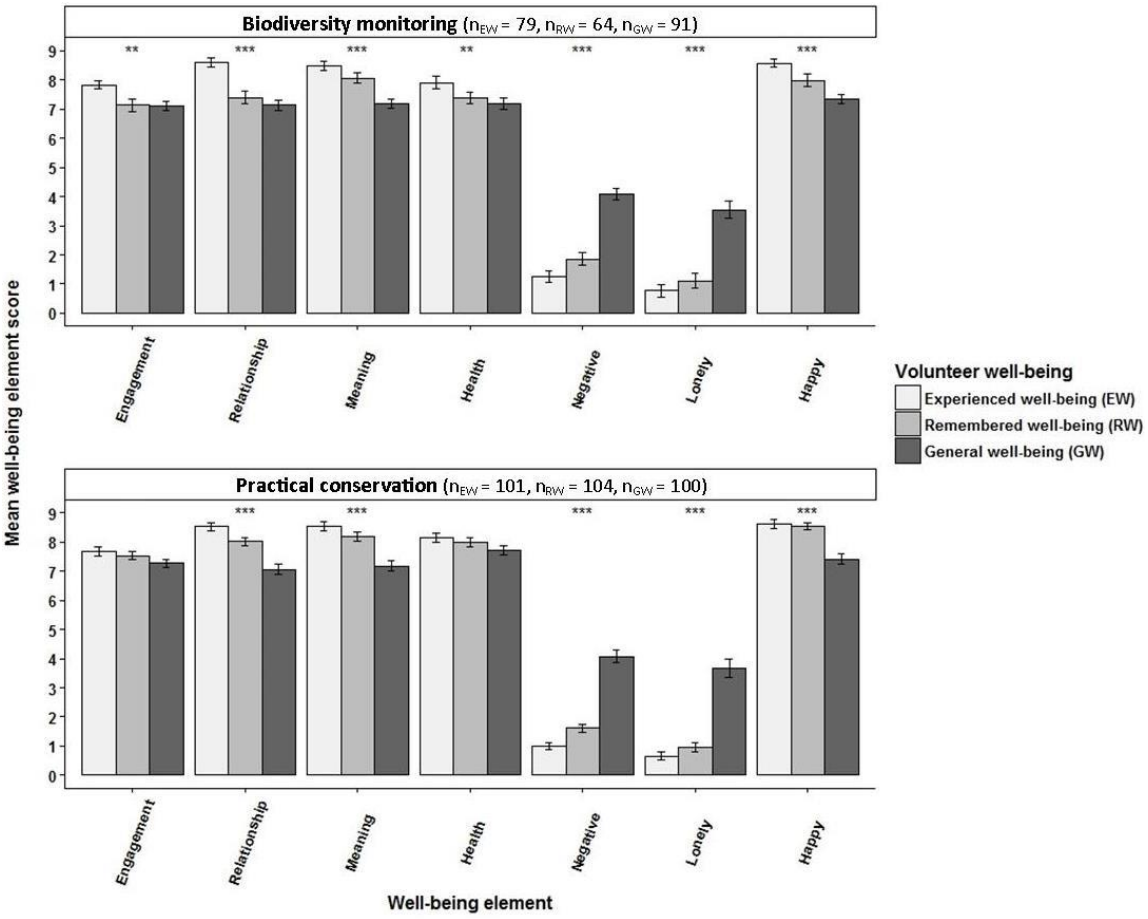


Figure 4.8. Experienced well-being just after volunteering ended and remembered volunteering-related well-being up to six months after volunteering compared to volunteers' general level of well-being in life for volunteers in biodiversity monitoring and practical conservation volunteering (±SE bars, Kruskal-Wallis tests, * p<0.05, ** p<0.01, *** p<0.001).

There was no effect of time since current volunteers last volunteered within the last six months on their well-being ratings (Study 2, n=277, Kruskal-Wallis, p>0.05 for all). Comparing the baseline general well-being of volunteers from Study 1 (n=191) and non-volunteers, defined as people not having volunteered for at least 6 months, from Study 2 (n=51), there were no significant differences in ratings for any well-being elements (Wilcoxon rank sum tests, p>0.05 for all).

4.3.2 Study 3: How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers?

4.3.2.1 Deriving the perceived well-being factors

Exploratory factor analysis performed on the volunteer manager data identified a four-factor model; however, fit indices indicated only marginal fit (RMSEA = 0.09 [90% CI = 0.053; 0.102], TLI = 0.91). Confirmatory factor analysis (CFA) based on the four-factor model developed revealed bad fit (RMSEA = 0.111 [90% CI = 0.089, 0.133], SRMR = 0.097, CFI = 0.880, TLI = 0.850). CFA based on the model from the self-reported well-being sample, but excluding the 'health' factor as there was only one item on health in the volunteer manager questionnaire, indicated an acceptable fit based on CFI (0.929), TLI (0.902) and SRMR (0.066), though RMSEA (0.100 [90% CI = 0.069, 0.130]) was high. The four-factor model from the self-reported well-being sample had significantly better fit than the models developed from the volunteer manager EFA ($\Delta\chi^2(36) = 90$, $p<0.001$), the original PERMA-P model (without the 'health' factor) ($\Delta\chi^2(72) = 223$, $p<0.001$) or a generic one-factor model ($\Delta\chi^2(6) = 146$, $p<0.001$) and it was therefore used for exploring perceived well-being further. Factor correlations based on the volunteer manager sample are summarised in Table 4.8.

4.3.2.2 External factors and perceived well-being

Stepwise multiple regression reduced the model for predicting the overall mean perceived well-being score to only include the significant variable of manager time spent with volunteers (measured on 1-6 scale, 6 being 100%, $p<0.05$) and the important variable of managers' level of education (measured on 1-6 scale, 6 being doctoral degree, $p<0.07$) as important factors ($F_{2,91} = 4.93$, $R^2_{adj} = 0.08$, $p<0.01$). Manager time spent with volunteers was significantly positively correlated with the overall mean perceived well-being score (MPS), as well as with the perceived 'engagement', 'relationship' and 'meaning' elements (Table 4.8).

Table 4.8. Final well-being factors ('engagement', 'relationship', 'meaning', 'negative emotion', 0-10 scale), descriptive statistics and correlations for volunteer manager sample (n=94-96).

Variable	Mean	SD	MV Time	Education	MPS	Eng.	Rel.	Mea.
MV Time	2.66	1.23	1.00					
Education	4.10	1.14	-0.20	1.00				
MPS	7.65	1.01	0.25*	-0.20	1.00			
Engagement	7.53	1.37	0.21*	-0.16	0.81**	1.00		
Relationship	8.02	1.35	0.22*	-0.19	0.86**	0.59**	1.00	
Meaning	8.41	1.15	0.22*	-0.12	0.70**	0.56**	0.67**	1.00
Negative	2.79	1.60	-0.06	0.07	-0.54**	-0.19	-0.37**	-0.08

Note. MV Time: manager time spent with volunteers (1-6 scale, 6 being 100%), MPS: mean perceived well-being score from all items, Education: 1-6 scale, 6 being doctorate degree, Eng.: engagement, Rel.: relationship, Mea.: meaning. * p<0.05, **p<0.001.

4.3.2.3 How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers?

Volunteer managers in different types of volunteering rated the well-being of their volunteers similarly, except for 'health' where managers in biodiversity monitoring also doing practical conservation rated their volunteers' 'health' higher than managers in non-environmental volunteering (Dunn's test, $z = 2.69$, $p < 0.05$) (Figure 4.9).

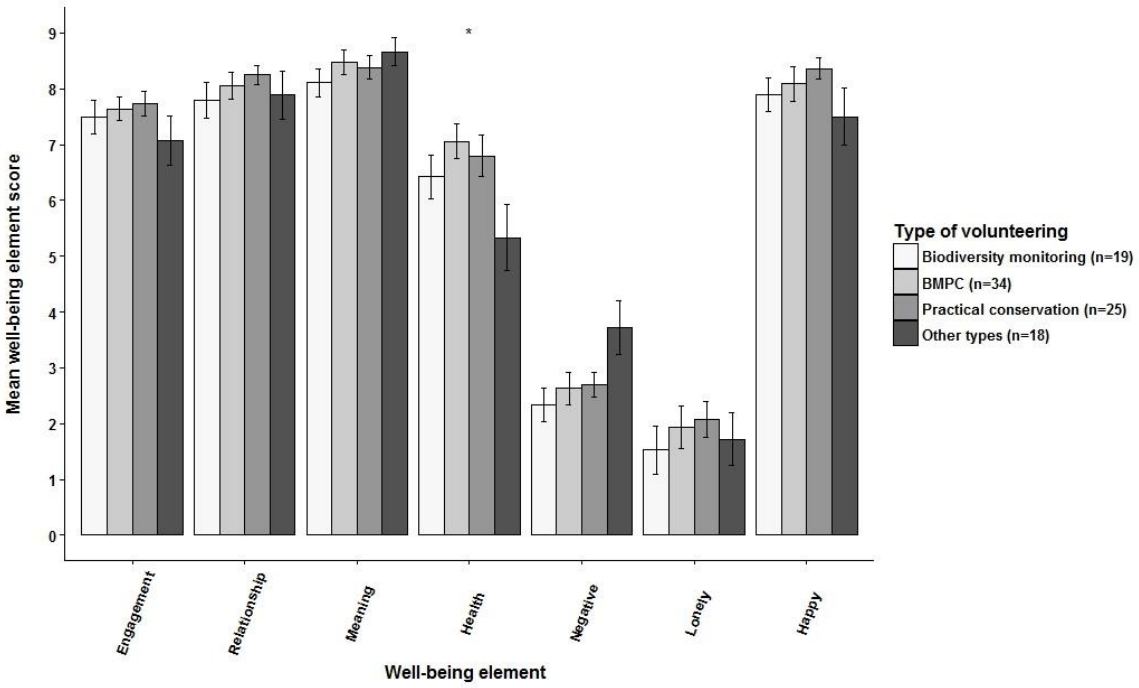


Figure 4.9. The perceived well-being of volunteers by different types of volunteer managers (mean score ±SE bars). Significant difference found only for Health (Kruskal-Wallis test, $\chi^2(3)=7.63$, * p=0.05). 'Engagement', 'relationship', 'meaning' and 'negative emotion' factor scores were means of factor item aggregates. 'Health', 'loneliness' and 'happiness' were single item measures. BMPC: Biodiversity monitoring volunteers also doing practical conservation work.

4.3.3 How do volunteer manager perceptions of volunteer well-being compare to volunteers' actual sense of volunteering-related well-being?

Volunteer managers' perception of the well-being of their volunteers corresponded to how volunteers felt just after volunteering ended ('experienced well-being') for 'engagement' and 'meaning' elements of well-being but significantly differed for 'health', 'negative emotions' and 'loneliness' in both biodiversity monitoring and practical conservation volunteering (Figure 4.10). Volunteer managers perceived their volunteers as significantly less healthy (Wilcoxon rank sum tests, $p<0.001$ for both types) and as having more 'negative emotions' (Wilcoxon rank sum tests, $p<0.001$ for both types) and feeling more 'lonely' (Wilcoxon rank sum tests, $p<0.01$ for both types) than was the experience of the volunteers. Managers in biodiversity monitoring also perceived volunteers' 'relationship' and 'happiness' elements significantly lower than volunteers reported they felt (Wilcoxon rank sum tests, $p<0.05$ for both).

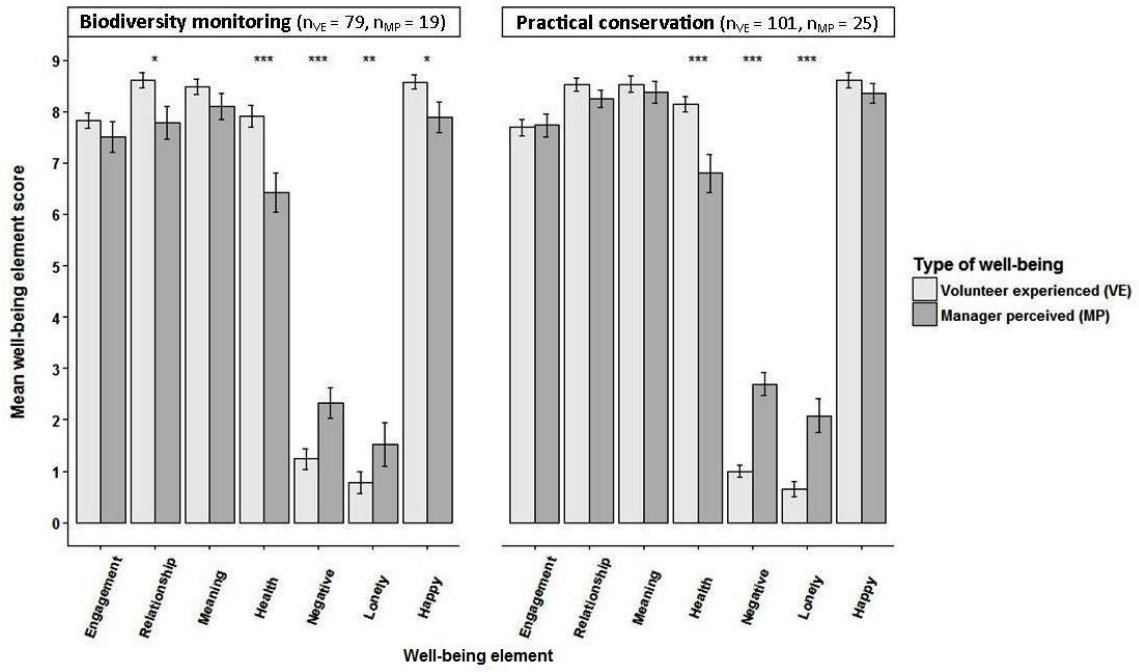


Figure 4.10. Volunteer experienced well-being just after volunteering ended compared to volunteer managers' perception of volunteer well-being (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures. Health was a mean of factor item aggregates for volunteers and a single item for managers (Wilcoxon rank sum tests, * p<0.05, ** p<0.01, *** p<0.001).

When volunteer managers' perception of the well-being of their volunteers was compared to how volunteers later rated their remembered volunteering-related well-being, there was still a significant difference for all types of volunteering with managers rating their volunteers' 'health' lower than the volunteers (Wilcoxon rank sum tests, $p<0.05$ for all types, Figure 4.11). Managers rated volunteers' perceived 'negative emotions' significantly higher than volunteers did in all types of volunteering (Wilcoxon rank sum tests, $p<0.05$), except biodiversity monitoring. Managers also rated volunteers' perceived 'loneliness' significantly higher in both

practical conservation and biodiversity monitoring also doing practical conservation volunteering than the volunteers (Wilcoxon rank sum tests, p<0.01 for both types). In non-environmental volunteering, managers rated the volunteers' perceived 'happiness' significantly lower than the volunteers (Wilcoxon rank sum test, p<0.05).

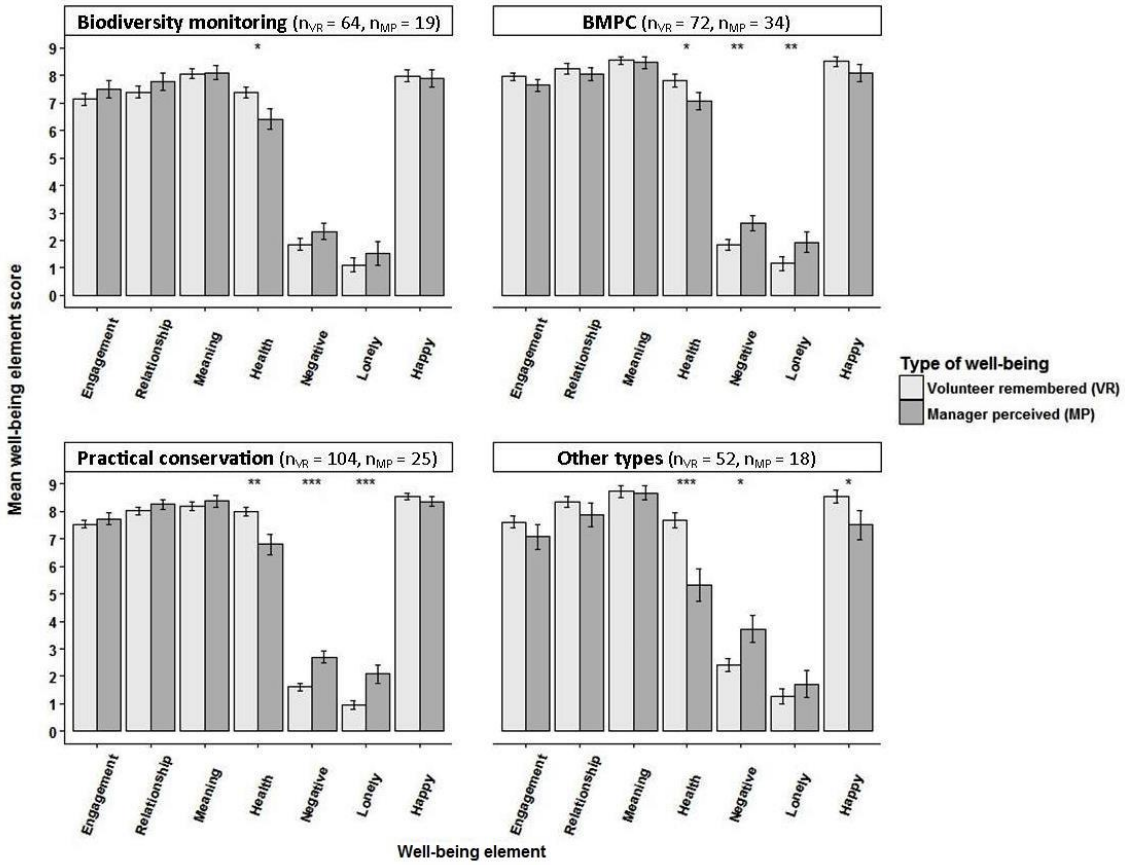


Figure 4.11. Volunteer remembered well-being compared to how managers perceive the well-being of their volunteers (±SE bars). BMPC: Biodiversity monitoring volunteers also doing practical conservation work. 'Engagement', 'relationship', 'meaning' and 'negative emotion' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures. 'Health' was a mean of factor item aggregates for volunteers and a single item for managers (Wilcoxon rank sum tests, * p<0.05, ** p<0.01, ***p<0.001).

4.4 Discussion

Overall, and supporting previous research, volunteering increased participants' immediate sense of well-being, both by increasing positive elements and by decreasing negative emotions and loneliness, and it did so more than other types of nature-based activities. Remembering the volunteer experience later on, volunteers retained the feeling of a meaningful event with low levels of negative emotions and loneliness, though other positive feelings of engagement or positive relationships were not retained. Contrary to previous research, this study found that volunteering did not increase volunteers' general level of well-being when compared to non-volunteers' general level of well-being. Volunteer managers did perceive the increase in the positive elements of their volunteers' well-being during volunteering but did not perceive

the significant decrease in negative emotions and loneliness their volunteers reported. The discussion sections below will further explore these points.

4.4.1 How nature-based activities immediately affects participants' sense of well-being

All nature-based activities examined in this research had a significant positive effect on some or all elements of participants' well-being, a result that agrees with previous studies (Koss and Kingsley 2010; O'Brien et al. 2010; Iwata et al. 2016; Wyles et al. 2016). However, contrary to many published studies that found volunteers had higher levels of well-being generally in life than non-volunteers (e.g. Harlow and Cantor 1996; Greenfield and Marks 2004; Konrath et al. 2012), this study found no significant difference between volunteers and non-volunteers in their general level of well-being. For the online sample in Study 2, reasons for this could be the relatively small sample size for non-volunteers (n=51) and a potential selection bias (Ahern 2005) in survey participation, as non-volunteers were not a random sample of people not volunteering, but rather people showing an interest in volunteering, either as former volunteers or potential future volunteers. However, findings in Study 1 were similar to Study 2 though students and walkers did not participate in this survey due to an interest in volunteering, suggesting it was not only a case of selection bias or small sample size.

The finding in the current study that volunteers who spend more time volunteering report higher immediate and remembered well-being supports previous studies (Thoits and Hewitt 2001; Binder and Freytag 2013). One study has suggested that between 100 and 800 volunteer hours per year provided the highest rates of well-being (Windsor et al. 2008). However, other studies have found that the benefits of volunteering over 100 hours per year either led to no further benefits (Morrow-Howell et al. 2003) or led to decreased benefits and satisfaction (Van Willigen 2000).

The lowered levels of 'negative emotions' and 'loneliness' during all nature-based activities support previous research showing that volunteering and restorative experiences can decrease mental health issues such as depression (Townsend 2006; Musick and Wilson 2008; Pillemer et al. 2010; Korpela et al. 2016). It also supports the idea that volunteering reduces unhappiness (Wilson 2012; Binder and Freytag 2013), and has a positive effect on the positive elements of people's well-being.

4.4.1.1 Volunteering and physical health

Volunteers reported an increase in their health immediately after volunteering, reflecting previous research into practical conservation volunteering where volunteers, even though reporting they were in pain after volunteering, gained a sense of achievement from the pain, and perceived it as something positive (O'Brien et al. 2010). However, this positive effect did not last as volunteers remembering their health during volunteering later on rated it similar to their general health, which was not different to the health of non-volunteers, suggesting there is no long-term positive effect of volunteering on perceived physical health. This finding supports previous research with similar findings (Piliavin and Siegl 2007; Borgonovi 2008; Jenkinson et al. 2013) though some studies have found a positive relationship between volunteering and physical health (Van Willigen 2000; Thoits and Hewitt 2001; Pillemer et al. 2010).

4.4.1.2 Biodiversity monitoring volunteers and students

The student group was the only participant group that did not consistently show improvements in all elements of well-being immediately after their activity. The unchanged sense of 'meaning' and lowered level of 'engagement' among students during their fieldwork could stem from them seeing the fieldwork as a mandatory activity that they did not freely choose, even if they did choose their university course. The feeling of personal control and choice of activity is important for an activity to be seen as a positive experience (Stukas et al. 1999). As volunteers had freely chosen to participate in their activity, this may be one reason for the differences in activity-related well-being between students and biodiversity monitoring volunteers, even though they were performing the same type of tasks.

4.4.1.3 Practical conservation volunteers and walkers

Walking has previously been shown to decrease participants' mental illness and negative affect and increase their sense of well-being (e.g. Marselle et al. 2014; Iwata et al. 2016), which was also found in this study. However, the current research also showed that even bigger decreases in negative affect can be achieved through practical conservation volunteering than through walking, and volunteering can have a positive effect on social relationships as well, an effect not consistently found for walking (Marselle et al. 2014). The 'positive relationship' element included an item on support from others: "To what extent did you receive help and support from others when you needed it during your walk/volunteering today?" This item was particularly differently rated by volunteers and walkers, suggesting that volunteers felt much supported in their volunteering by volunteer managers and other volunteers, whereas walkers possibly either did not perceive a need to be supported or were not supported and therefore rated the item lower than volunteers. For practical conservation volunteers, the coffee and

lunch breaks provided additional opportunities for social interactions, which were important to the volunteers, as highlighted by a comment from a practical conservation volunteer to the 'engagement' item 'To what extend did you lose track of time during volunteering today?'

> "I never lose track of time, I always know what time it is: It is either before coffee, after coffee, before lunch or after lunch!"
>
> (Male volunteer, practical conservation)

Volunteering has previously been found to benefit social well-being (Onyx and Warburton 2003; Koss and Kingsley 2010; O'Brien et al. 2010; Son and Wilson 2012), which was also the case in this study with practical conservation volunteers having significantly higher levels of 'positive relationships', not only during the volunteer activity but also generally in life, than walkers did. Volunteering provides a space where people are having fun with others, can engage in meaningful conversations and feel they are understood, all of which can increase the quality of social relationships (Reis et al. 2000).

4.4.2 How volunteers sustained the memory of the experienced sense of well-being

When volunteers recalled their experience of volunteering later on and up to six months after volunteering, their ratings of their well-being during volunteering were less positive than immediately after volunteering. This difference between experienced and remembered well-being during volunteering is likely partly due to recall bias (Stone et al. 1999; Baumeister et al. 2001) which is the imperfect recollection of past emotions or events by respondents. It has been shown that 'bad is stronger than good' (see review in Baumeister et al. 2001), which means that people remember and put more emphasis on negative events and emotions compared with positive events and emotions. Also volunteers in this research remembered the negative, as in the lowered 'negative emotions' and 'loneliness', better than the increased positive well-being indices. The 'meaning' element retained its high rating over time, supporting previous research that also showed retention of meaning (Wyles et al. 2016), and suggesting it may be a more robust construct than the 'engagement' or 'relationship' factors that did not retain their high ratings over time. 'Meaning' is part of eudaimonia and as such has been suggested to be longer-lasting than hedonic emotions, or moods, such as 'positive emotions' and partly the 'engagement' element (Piliavin 2009).

4.4.3 Volunteer managers' perception of volunteer well-being and how it compares to actual volunteer well-being

Managers in environmental volunteering rated the 'health' element of their volunteers' well-being higher than non-environmental volunteer managers did. This difference between environmental and non-environmental managers' perception of their volunteers' health is possibly a reflection of the physical stamina and strength needed to perform environmental volunteering (O'Brien et al. 2010), whether the tasks are clearing invasive species or walking across uneven ground to record the species composition of an area. Volunteer managers spending more time with their volunteers seemed to better understand the well-being of their volunteers, as they rated their volunteers' well-being more similar to volunteers' ratings than managers who spent less time with their volunteers. However, managers still perceived volunteers as having more 'negative emotions', being 'lonelier' and being in worse 'health' than volunteers themselves reported. These worse ratings of negative indices are in line with previous research. A meta-analysis of self-reported and other-reported agreement in well-being ratings found an average correlation of 0.42 between average self-ratings and other-reported ratings for a combined score of life satisfaction, happiness, positive affect and negative affect (Schneider and Schimmack 2009). Positive and negative affect measures had relatively low agreement, and negative affect (r=0.18) had less agreement than positive affect (r=0.24) (Schneider and Schimmack 2009). Again, this finding could reflect that managers also put more emphasis on and remember negative emotions and events better than positive emotions and events (Baumeister et al. 2001).

4.4.4 Using a multidimensional approach to well-being in a volunteering context

It has been suggested that volunteering brings both hedonic and eudaimonic well-being benefits to volunteers (Piliavin 2009), and such a multidimensional approach to well-being was supported by this research. It recovered five of the seven proposed factors from the PERMA-Profiler (Butler and Kern 2016), including the 'engagement', 'relationship', 'meaning', 'health' and 'negative emotion' factors, but excluding the 'positive emotion' and 'achievement' factors. 'Achievement' items instead related to both the 'engagement' and 'meaning' factors, suggesting volunteers may not have set goals for themselves within their volunteering role and therefore not been focused on the achievement of any specific goals. This scenario was also supported by comments from volunteers stating that they did not have specific goals for their volunteering. 'Positive emotion' items instead related to the 'engagement' and 'relationship' factors, suggesting that volunteers did not pursue the positive emotions themselves, but rather that positive emotions arose due to positive relationships and task engagement during

volunteering. Future research is needed to further tease apart these relationships in a volunteering context. The value of a multidimensional approach to well-being in the volunteering context is the information gained about how volunteering affects the various elements of well-being differently. In this sample of volunteers, the effects of volunteering were all positive; however, for the students, their engagement decreased during their fieldwork, highlighting an area that should be investigated further to find ways to turn this negative effect around.

4.4.5 Implications

Walking has been advocated as a public health intervention (Marselle et al. 2014; Iwata et al. 2016) which the present findings support. However, they also suggest that environmental volunteering may provide increased benefits over and above the benefits of walking. For public health providers, this highlights environmental volunteering as a potential health intervention and a way to reintegrate people into society (O'Brien et al. 2011) by providing opportunities for positive relationships to develop. However, care must be taken to ensure that people actively choose the activity and do not feel forced to volunteer, as personal control and choice is important for a positive outcome (Stukas et al. 1999). For volunteer organisations, these positive results highlight that environmental volunteer projects provide benefits to the volunteers themselves and could be useful in motivating people to begin volunteering. In addition, it provides an opportunity to showcase to funding bodies that environmental volunteer projects provide positive outcomes also for the people involved in the projects.

The use of multidimensional well-being measures can provide the information that volunteer organisations and managers need to support and enhance the well-being of their volunteers. By assessing the individual elements, areas for improvement can be specifically targeted. For example, if the 'meaning' element is rated low by volunteers, improved feedback could be provided to volunteers to enhance their understanding of their role and thereby the meaning they derive from their volunteering. If 'relationships' are rated low, focus should be put on providing adequate support to volunteers during volunteering, as well as ensuring volunteers feel appreciated. Even if volunteers find their roles meaningful and relationships good, their 'engagement' may be lacking if they are not given interesting tasks and opportunities to fully immerse themselves in their volunteer tasks.

4.5 Conclusion

This chapter has shown the benefits of regarding volunteer well-being as a multidimensional construct to better understand how volunteering affects the various elements of well-being. It has highlighted how environmental volunteering immediately improved the well-being of participants, even more than other nature-based activities did. Volunteering improved participants' well-being especially by lowering negative emotions and loneliness and this was remembered long after volunteering ended. Most volunteer managers, however, did not perceive this significant decrease in negative emotions and loneliness in their volunteers during volunteering, although they did perceive an increase in positive well-being elements. This focus on negative emotions and events is possibly due to the well-established theory that 'bad is stronger than good'. The findings of this research suggest that it would be beneficial for volunteer organisations to use multidimensional assessment of volunteers' well-being and managers' perception of their volunteers' well-being if they wish to gain a deeper understanding of actual well-being, gaps in volunteer managers' perceptions and potential areas for improvement. The PERMA model of well-being is one possible approach to assessing the multidimensionality of well-being, though it needs further exploration and validation, and it should be expanded to include negative emotions and loneliness as suggested by the PERMA-Profiler.

Chapter 5 The association between volunteer motivations and volunteer well-being, and the significance of fulfilling motivations

Abstract

Volunteer motivations, fulfilment of those motivations and volunteer well-being as well as the synergies between these aspects are key components of volunteering and yet they are rarely investigated together. This chapter aims to explore the fulfilment of motivations through the motivational benefits volunteers gain from their volunteering and to investigate the synergies between volunteer motivations, motivational benefits, fulfilment of motivations and volunteer well-being. Paired onsite surveys were conducted of practical conservation and biodiversity monitoring volunteers (n=223) to measure level of day-specific motivation and general well-being before their volunteering and volunteering-related well-being and level of general motivation for volunteering immediately after their volunteering. Online surveys of current, former and potential volunteers (n=494) measured motivations and motivational benefits as well as volunteering-related and general levels of well-being. To allow a deeper understanding of associations, volunteer motivation and well-being were measured using adapted multidimensional models of the Volunteer Functions Inventory and the PERMA Profiler, respectively. Data were analysed using correlations, generalised linear models and hierarchical regression. Results showed that most volunteer motivation and motivational benefit factors, except those relating to career development, were positively associated with volunteer satisfaction and positive indices of well-being, such as engagement, relationships, meaning, health and happiness. Career motivations, as well as motivations for reducing negative personal qualities or feelings, were positively associated with negative emotions, but recreation motives worked to counteract this negative association. Results also showed that the motivations of former volunteers had not been fulfilled, highlighting the importance for volunteer organisations to fulfil volunteers' motivations to retain them. This chapter shows the importance of investigating volunteer motivation and well-being as multidimensional constructs as different motivational factors relate differently to the various well-being elements.

5.1 Introduction

Volunteering is important in society today, not only because of the benefits to organisations engaging volunteers, but also because of the influence of volunteering on volunteers themselves. One area of research has focused on this influence in terms of increased volunteer well-being, such as better social networks, better physical health and lower rates of depression (e.g. Wheeler et al. 1998; Thoits and Hewitt 2001; Wilson 2012). Another area has focused on what motivates volunteers to spend their time volunteering, such as their values and beliefs, wanting to understand the world and themselves better and gaining career benefits (e.g. Clary et al. 1996; Okun and Schultz 2003; Stukas et al. 2009). These two areas are connected through the volunteer experience where volunteers may accrue motivational benefits and thereby get their motivations fulfilled (Clary et al. 1998; Stukas et al. 2009). Though a range of studies have focused on either volunteer motivation (see chapter 3) or volunteer well-being (see chapter 4), only few studies have addressed the question of how volunteer motivation and volunteer well-being are associated, and how they are connected through volunteer motivational benefits and fulfilment. This chapter addresses these questions by building on the results from the previous two chapters on volunteer motivation and well-being and adding motivational benefits and fulfilment data to explore the motivational benefits volunteers gain from their volunteering and to investigate the synergies between volunteer motivations, motivational benefits and fulfilment and volunteer well-being.

5.1.1 Associations between volunteer motivations and volunteer well-being

To gain a deeper understanding of the motivational processes taking place in the volunteering context, Clary et al. (1992, 1998) advocated using the functional approach (Katz 1960) (previously discussed in chapter 3). The functional approach suggests that similar volunteer activities can result from markedly different underlying motivations, such as ‘values’ (expressing or acting on important personal beliefs), ’understanding’ (wanting to learn more about the world, other people and themselves), ‘social’ (strengthening social relationships), ‘protective’ (reducing negative feelings or to address personal problems), ‘enhancement’ (increasing ego growth and development) and ‘career’ (gaining career-related skills and experience) motivations (Clary et al. 1998). Similarly, as discussed in chapter 4, the PERMA Profiler can be used to gain a better understanding of volunteers’ well-being, investigating ‘engagement’ (becoming fully absorbed in the task), ‘relationships’ (feeling appreciated and receiving help and support when needed), ‘meaning’ (doing something worthwhile and having a purpose), ‘health’ (being satisfied with one’s physical health), ‘happiness’, ‘negative

emotions' (sadness, frustration and anxious) and 'loneliness' as important elements of well-being (Seligman 2011; Butler and Kern 2016).

Previous studies have investigated the effect of overall motivation or individual motivational factors on some individual well-being elements, such as personal relationships (Gillath et al. 2005), health (Ho et al. 2012; Konrath et al. 2012) and negative affect (Stukas et al. 2009), or on an overall measure of well-being (Stukas et al. 2016a) as well as volunteer satisfaction (Finkelstein 2008b; Stukas et al. 2009, 2016a; Ho et al. 2012; Güntert et al. 2015). The association between volunteer motivation and satisfaction has been the main focus of research until now and satisfaction is commonly treated as an outcome of volunteering (Clary et al. 1996; Stukas et al. 2009; Güntert et al. 2015), though it has also been treated as part of the volunteer experience (Finkelstein 2008b) or as a measure for volunteer well-being (Ho et al. 2012). Though most studies (but see Stukas et al. 2009) have found associations between motivation and satisfaction, not all motivational factors are equal in relation to achieving volunteer satisfaction (Stukas et al. 2016a). 'Values', 'understanding' and 'enhancement' motivations (all factors from the VFI) were found to be positively related to satisfaction, whereas 'career' motivation (also a factor from the VFI) was negatively associated with satisfaction (Finkelstein 2008b; Ho et al. 2012; Güntert et al. 2015; Stukas et al. 2016a). Ho et al. (2012) and Güntert et al. (2015) also found 'social' motives (from the VFI) to be positively correlated with satisfaction. The last of the six factors from the VFI, the 'protective' motivation, was found to be either positively (Ho et al. 2012) or negatively (Stukas et al. 2016a) associated with volunteer satisfaction.

It has been argued that 'other-oriented' motivations, i.e. altruistic motivations, are positively associated and 'self-directed' motivations, i.e. egoistic motivations, are negatively associated with volunteer satisfaction and well-being (Stukas et al. 2016a). However, the definitions of other-oriented and self-directed motivations differ, with the 'values' motivation accepted as the main other-oriented motivation, the 'social' motivation occasionally seen as other-oriented (Konrath et al. 2012; Stukas et al. 2016a) and the 'understanding' motivation in some cases argued to be other-oriented as it relates to the exploratory system and the desire to learn new things about the world (Gillath et al. 2005; Stukas et al. 2016a). Self-directed motives include the other three motivational factors from the VFI, 'enhancement', 'protective' and 'career' factors. The few available studies on the association between motivation and different aspects of well-being generally follow the pattern for satisfaction, with other-oriented motivations being positively associated with well-being and self-directed motivations being negatively associated with well-being. For example, other-oriented motives were

associated with lower levels of loneliness and better interpersonal functioning (Gillath et al. 2005), better health (Ho et al. 2012), lower mortality rates (Konrath et al. 2012) and better overall well-being (Stukas et al. 2016a) than self-oriented motives. The differential associations of different motivations with the various elements of well-being and satisfaction underline the importance of investigating volunteer motivation and well-being as multidimensional constructs.

5.1.2 The volunteer experience and motivational benefits

Many studies (e.g. Clary et al. 1992, 1998; Bruyere and Rappe 2007; Bramston et al. 2011) emphasise the importance for volunteer organisations of not only identifying volunteers' motivations but also subsequently fulfilling those motivations, both through their marketing and recruitment campaigns to recruit new volunteers and in the way the organisations engage current volunteers in their activities to retain them. As volunteers in a group performing the same volunteer task may have different underlying motivations for doing so, the organisation needs to provide a range of opportunities for the volunteers to be able to fulfil, or match, their diverse motivations (Clary et al. 1992). This is also the basis for the functional approach's 'matching principle' where a match between a volunteer's important motivations and certain features of the volunteer experience, the 'motivational benefits', leads to satisfaction with the volunteer experience (Clary et al. 1992, 1998). Some studies have shown that this is indeed the case, as volunteers feeling their motivations are fulfilled by their volunteer experience also report higher levels of satisfaction with their volunteering (Clary et al. 1998; Stukas et al. 2009; Güntert et al. 2015).

Though some previous studies showed that fulfilled volunteer motivations led to satisfaction, all motivations are not equally important to fulfil for volunteers. Clary et al. (1998) showed that fulfilling especially 'value' and 'enhancement' motivations were important with 'understanding' and 'social' motivations slightly less important for volunteer satisfaction. Another study also found that 'career' motivations needed to be fulfilled for volunteer satisfaction, but also 'social' motivational fulfilment was important, whereas fulfilment of other motivations was not important for volunteer satisfaction (Tschirhart et al. 2001). Contrary to this, Finkelstein (2008) found that all factors, except 'career' motivation and motivational benefits, were correlated with volunteer satisfaction. Only one study investigated any elements of well-being and found that positive affect was not influenced by overall motive score but was positively influenced by the overall motivational benefit score and a match score

for fulfilled motivations, and that negative affect was only influenced by the match score (Stukas et al. 2009).

5.1.3 Aim and research questions for this chapter

The aim of this chapter was to explore the fulfilment of volunteer motivations through the motivational benefits volunteers gain from their volunteering and investigate the relationships between volunteer motivations, motivational benefits and fulfilment and volunteer well-being for current, former and potential future volunteers. The research questions addressing this aim were:

1) How do the motivational benefits differ between demographic groups and types of volunteering?
2) What are the synergies between volunteers' motivations, motivational benefits and fulfilment and their sense of well-being?
3) For current volunteers, how do volunteer motivations and the fulfilment of those motivations predict volunteers' sense of well-being during volunteering?

5.2 Methods

Data were obtained from two studies, Study 1) an onsite study of biodiversity monitoring and practical conservation volunteers (appendix IV for the full questionnaire), and Study 2) an online survey of former, current and potential volunteers (appendix VI for the full questionnaire). The three research questions for this chapter were addressed using data from the two studies with results presented as outlined in Table 5.1.

Table 5.1. Overview of research questions, studies and elements in this chapter.

Research questions	Results section	Study 1 (onsite)	Study 2 (online)
1) How do the motivational benefits differ between demographic groups and types of volunteering?	Section 3.1		Motivational benefits + MFI (section 3.1)
2) What are the synergies between volunteers' motivations, motivational benefits and fulfilment and their sense of well-being?	Section 3.2	Motivation + well-being (section 3.2.1)	Motivation + motivational benefits + MFI + well-being (section 3.2.2, current volunteers; section 3.2.3, former volunteers; section 3.2.4, potential volunteers)
3) For current volunteers, how do volunteer motivations and the fulfilment of those motivations predict volunteers' sense of well-being during volunteering?	Section 3.3	Motivation + well-being (section 3.3.1)	Motivation + motivational benefits + MFI + well-being (section 3.3.2)

5.2.1 Procedure and participants

Study 1: The onsite study was conducted between October 2014 and September 2015 and involved ten organisations from Southern England with volunteers in either biodiversity monitoring (BM) or practical conservation (PC, Table 4.2). The survey was designed as a paired before-activity and after-activity survey to measure the change in volunteers' level of motivation and well-being (see details under section 5.2.2.1 and section 5.2.2.3, respectively). Volunteers only completed the paired set of 'before volunteering' and 'after volunteering' questionnaires at one volunteer activity to ensure independent samples.

Table 5.2. Respondents and descriptive statistics of groups in the onsite survey (Study 1).

Activity type	$n_{before\ volunteering}$	$n_{after\ volunteering}$	Number of organisations	Number of sample dates	Group sizes (mean ±SD)	Hours of activity (mean ±SD)
Biodiversity monitoring	103	97	8	16	12.68 (±5.95)	3.74 (±1.60)
Practical conservation	120	110	2	15	13.45 (±7.64)	4.58 (±1.04)

Study 2: Environmental organisations worldwide and volunteer centres in the UK were asked to invite their volunteers to participate and the survey was also sent out more widely through

professional networks and social media such as email lists and LinkedIn groups. The online survey was open for three months between September and December 2015. Respondents selected a principal organisation for which they previously or currently volunteered and answered questions with regard to that organisation in relation to their motivations, motivational benefits and well-being (see section 5.2.2 for details on measures). A total of 494 responses were received with completed questions for at least one of the measures described below. Some respondents had skipped or missed questions as questions were not compulsory, thereby lowering the sample sizes for some measures. Sample sizes are given in the results section. This design resulted in respondents from three different periods: former volunteers (19%), current volunteers (67%) and potential future volunteers (14%). They were grouped into four types of volunteers: biodiversity monitoring volunteers (21%), practical conservation volunteers (34%), biodiversity monitoring volunteers also doing practical conservation volunteering (27%), and all other types of volunteering (18%, Table 5.3). The total sample was comprised of 54% females and 45% males with an age range from 18 to 88 years old (mean=54.70, *SD*=16.12). Most respondents had at least one university degree (65%) and many were retired (49%) or in full-time employment (21%). Respondents were from 13 different countries, with the majority residing in the United Kingdom (87%). Respondents named 128 different organisations they previously or currently volunteer for or would like to volunteer for in the future. Former and current volunteers volunteered on average once a week, 35 hours per month and had been volunteering for an average of 11 years.

Table 5.3. Type of volunteers and volunteer status of respondents (n=494). BMPC: Biodiversity monitoring volunteers also doing practical conservation work.

Volunteer type	Former volunteers	Current volunteers	Potential volunteers	Total
Biodiversity monitoring	4.25%	14.78%	1.82%	20.85%
BMPC	4.45%	16.80%	5.47%	26.72%
Practical conservation volunteers	6.88%	23.28%	3.44%	33.60%
Other types of volunteers	3.64%	12.15%	2.02%	17.81%
Undisclosed			1.01%	1.01%
Total	*19.23%*	*67.00%*	*13.77%*	*100.00%*

5.2.2 Measures

5.2.2.1 Volunteer motivation

Study 1: Volunteers' level of motivation in the onsite study was measured twice in relation to the same volunteering activity: 1) before the volunteering activity started for volunteers' level

of motivation for volunteering on that day (termed 'day-specific motivation') with one item, "Thinking about your volunteer activities today, how motivated are you about your volunteering today on a scale from 1 (not at all motivated) to 7 (extremely motivated)?" and 2) after the volunteer activity for volunteers' general motivation to volunteer with one item, "In general, how motivated are you about your volunteering on a scale from 1 (not at all motivated) to 7 (extremely motivated)?"

Study 2: The Volunteer Functions Inventory (VFI) (Clary et al. 1998) was adapted to reflect more recent research on motivations and environmental context (Ryan et al. 2001; Roggenbuck et al. 2001; Esmond and Dunlop 2004; Bruyere and Rappe 2007; Dolnicar and Randle 2007; Guiney and Oberhauser 2009; Wahl 2010; Raddick et al. 2010, 2013; Bramston et al. 2011; Asah and Blahna 2012; Chatters 2013b) and used to assess volunteer motivation (Chapter 2, section 2.3.2.1 for details of adaptations). Through factor analysis, six factors were identified as important underlying reasons why people volunteer (chapter 3 for details of factor analysis). In summary, the first five factors identified with five of the original factors from the VFI: 1) 'values', to express or act on important personal beliefs, 2) 'understanding', to learn more about the world, other people and themselves, 3) 'social', to strengthen social relationships, 4) 'protective', to reduce negative feelings or to address personal problems, and 5) 'career', to gain career-related skills and experience (Clary et al. 1992). The final factor was identified as 6) 'recreation', to spend time outside and get exercise. All items were scored on a 7-point Likert scale (Likert 1932) ranging from 1 (not at all important or accurate) to 7 (extremely important or accurate). Motivational factor values were calculated as the mean of the items belonging to the individual factors. The mean motivation score (MMS) was calculated as the mean of all 34 motivational items on the questionnaire. The division between other-oriented and self-oriented motives from Stukas et al. (2016a), defining the 'values', 'understanding' and 'social' motivations as other-oriented motives and the 'protective', 'career' and 'enhancement' motivations as self-oriented motives, was adopted. As the 'recreation' items originated from the original 'enhancement' factor, 'recreation' motivation was also regarded as a self-oriented motive.

5.2.2.2 Volunteer motivational benefits

Volunteer motivational benefits were only measured in study 2, as questionnaires in study 1 needed to be kept short to ensure the highest possible participation. Respondents in study 2 reported their motivational benefits of volunteering using a 12-item measure adapted from previous research (Clary et al. 1998; Stukas et al. 2005, 2009, Table 5.4) to correspond with the adapted VFI items. The 12 motivational benefits were linked to the original six motivational

factors from the VFI with two items each; however, after factor analysis of motivations (chapter 3), only five of these proposed motivational factors remained. Of the two items from the proposed 'enhancement' motivational benefit factor, one item was dropped as the corresponding motivational item had been dropped in the factor analysis and the other item was moved to the 'protective' motivational benefit factor to match the 'protective' motivational factor composition. As 'recreation' was a new motivational factor, there were no motivational benefit items related to this factor, hence only five motivational benefit factors are presented here. Items were rated on a 7-point Likert scale. The motivational benefit factor values were calculated by averaging the items belonging to the individual factors. The mean motivational benefit score (MMBS) was calculated as the average of all 12 motivational benefit items on the questionnaire.

Table 5.4. Motivational benefit factors corresponding to motivational factors, and Cronbach's α for internal consistency of motivational benefit factors.

Factor	α	Motivational benefit	Source
Values	**0.6**	I am able to express my personal values by volunteering	Clary et al. 1998 (adapted)
		I am doing something for a cause that I believe in by volunteering	Clary et al. 1998; Stukas et al. 2009 (adapted)
Understanding	**0.65**	I learn more about nature by volunteering (BM, BMPC, PC only)	Stukas et al. 2005, 2009 (adapted)
		I learn something new about the world by volunteering	Clary et al. 1998 (adapted)
Social	**0.46**	The work I perform as a volunteer is appreciated	Clary et al. 1998 (adapted)
		I live up to the expectations of my friends or family by volunteering	Stukas et al. 2005 (adapted)
Protective	**0.81**	I was able to escape some of my troubles	Clary et al. 1998; Stukas et al. 2009
		By volunteering I feel less lonely	Clary et al. 1998; Stukas et al. 2005 (adapted)
		I feel better about myself as a result of my volunteering	Clary et al. 1998; Stukas et al. 2009 (adapted)
Career	**0.92**	I learned some skills that will be useful in my future career by volunteering	Clary et al. 1998; Stukas et al. 2009 (adapted)
		In volunteering with this organisation, I made new contacts that might help my business or career	Clary et al. 1998; Stukas et al. 2009

5.2.2.3 Well-being

Well-being was investigated using a positive psychology approach based on the PERMA well-being theory proposed by Seligman (2011) and using the PERMA Profiler (PERMA-P) developed by Butler and Kern (2016). Through factor analysis (chapter 4 for details), five factors were identified to evaluate volunteer well-being. In summary, the five factors identified with five of the original seven factors from the PERMA-P: 1) 'engagement', employing one's strengths to a task, becoming fully absorbed in the task and therefore completely lose track of time, 2) 'relationships', feeling appreciated and supported, 3) 'meaning', the feeling of doing something worthwhile and having a purpose and direction in life, 4) 'negative emotions', feeling sad, frustrated or anxious, and 5) 'health', having good health and being satisfied with one's health. In addition to these factors, 'loneliness' and 'happiness' were each evaluated using a single item. All items were scored on an 11-point (0-10) Likert scale (Likert 1932). Well-being factor values were calculated as the mean of the items belonging to the individual factors. Overall mean well-being was calculated as the mean of all 23 well-being-related items on the questionnaire including the 15 PERMA items as well as items for 'health', 'negative emotions' (reverse scored), 'loneliness' (reverse scored) and 'happiness'.

In study 1, volunteers' general well-being in life was measured before the volunteer activity and their activity-related well-being was measured just after the volunteer activity ended. In study 2, current volunteers completed questions regarding their remembered well-being during volunteering and former volunteers and potential future volunteers completed questions regarding their general well-being in life.

5.2.2.4 Satisfaction

Study 1: Similarly to motivation, satisfaction was measured twice in relation to the same volunteering activity: 1) Before the volunteer activity, satisfaction with life in general was measured by a single item, "How satisfied are you with your life at present?". A similar single item is widely used for measuring satisfaction with life (e.g. Office for National Statistics 2015; OECD 2016). 2) After the volunteer activity, satisfaction with the volunteer experience was measured by a single item, "How satisfied are you with your volunteering experience today?". A similar single item was used by Stukas et al. (2009).

Study 2: Satisfaction with the volunteer experience was measured by a single item, "Overall, how satisfied are you with your volunteer experiences?". In both studies, satisfaction was measured on an 11-point Likert scale (0, *not at all* – 10, *completely*).

5.2.3 Motivational Fulfilment Index

The Motivational Fulfilment Index (MFI) was only possible to calculate from responses in study 2, where respondents had reported on both their motivations and motivational benefits. To calculate the MFI, a 'match score' was calculated for each motivational factor, 'values', 'understanding', 'social', 'protective' and 'career', and multiplied by the motivation's ranking, and all resulting values were then summed to create the MFI. The match score was '1' if the motivational benefit factor value was equal to or greater than the motivational factor value, i.e. the motivation was fulfilled, otherwise it was scored as '0'. Motivational factors were based on the average motivational factor value, with the highest value having a rank of 5 and the lowest value a rank of 1 to reflect the differential importance of motivations. When there were ties, the rankings were split, i.e. if two values were the same and would have rankings 4 and 3, both were awarded 3.5. Subsequently the MFI was calculated as the match score for each factor multiplied by the rank of that factor (e.g. 'understanding' match score x 'understanding' factor rank) and summed across factors. With five possible matches and rankings from 5 to 1, the MFI ranges between 0 (no matches at all) to 15 (all five motivations fulfilled). This way of calculating the MFI recognises that all motivations are not equally important to volunteers and it allows a match of low importance motivations to have an, albeit small, positive effect, unlike previously suggested match indices by Clary et al. (1998) and Stukas et al. (2009).

5.2.4 Data analyses

All motivation, motivational benefit and well-being variables had skewed distributions and as they were measured on Likert scales, they also had bounded distributions, 1-7 for motivation and 0-10 for well-being variables, and errors were non-normal. One approach to dealing with this type of data is through the use of generalised linear models (GLMs) with binomial errors (Crawley 2007). Thus all variables were transformed to proportional data by dividing values by the highest possible variable value, creating distributions between 0 and 1. Correlation analysis was performed on the transformed data. All statistical analyses were completed using RStudio v.3.2.3 (RStudio Team 2015).

Study 1: Generalised linear regression was performed to establish if level of motivation predicted volunteering-related well-being.

Study 2: Wilcoxon rank sum and Kruskal-Wallis with post hoc Dunn's tests were performed on the untransformed data. Hierarchical generalised linear regression was performed to establish if fulfilment of motivations through motivational benefits, entered in the model as the

Motivational Fulfilment Index (MFI), would increase the amount of variance explained for well-being elements over and above the amount explained solely by the motivational factors. Hierarchical regression was performed on the full sample including all types of volunteers to ensure a sufficiently large sample size. To test the overall multiple regression, sample size should be at least 50 + 8 x the number of independent variables, and to test the individual predictors it should be at least 104 + number of independent variables (Tabachnick and Fidell 1996), thus requiring a minimum sample size of 106 and 110, respectively.

It should be noted here that using hierarchical regression does not identify the best predictor models, as including non-significant predictors may in fact reduce the R^2 for the overall model (Tabachnick and Fidell 1996). However, it does allow comparison between models for different elements of well-being and it tests if adding an additional predictor variable to the models affects the overall prediction potential of the models (Tabachnick and Fidell 1996). To evaluate if best fit models would change the outcomes and conclusions, backward stepwise regression was run with all models and then hierarchical regression was performed adding MFI in step two. Though R^2 was improved for the best fit models, the overall outcomes and significance did not change and therefore the complete model including all six motivational factors as predictors is presented here.

5.3 Results

5.3.1 How do motivational benefits differ between demographic groups and types of volunteers (study 2)?

Demographic groups investigated were based on age (18-34, 35-49, 50-64, 65+), gender (female, male) and volunteer period (former, current), and volunteer types investigated were biodiversity monitoring, practical conservation, biodiversity monitoring also doing practical conservation and other non-environmental types of volunteering. Current and former volunteers differed significantly only in their 'career' motivational benefit ratings (Wilcoxon rank sum test, $p<0.05$, Table 5.5). Environmental volunteers had significantly higher 'understanding' benefits than non-environmental volunteers (Kruskal-Wallis with post hoc Dunn's test, $p<0.05$), with biodiversity monitoring volunteers who also conduct practical conservation work also having a significantly higher rating than volunteers only performing one of the two tasks (Kruskal-Wallis with post hoc Dunn's test, $p<0.01$). Biodiversity monitoring volunteers had lower 'social' benefits than either biodiversity monitoring volunteers also performing practical conservation or non-environmental volunteers (Kruskal-Wallis with post hoc Dunn's test, $p<0.05$), and they also had lower 'protective' benefits than non-

environmental volunteers (Kruskal-Wallis with post hoc Dunn's test, $p<0.05$). Women rated their 'understanding' and 'career' benefits significantly higher than men (Wilcoxon rank sum tests, $p<0.001$). Volunteers under 35 years of age rated their 'protective' benefits significantly higher than volunteers aged 50 years or older (Kruskal-Wallis with post hoc Dunn's test, $p<0.05$). Volunteers under 50 years of age rated their 'career' benefits significantly higher than volunteers aged 50 years or older (Kruskal-Wallis with post hoc Dunn's test, $p<0.001$). There were no significant differences within any categories in mean MFI ($p>0.05$). It should be noted here that categories, i.e. period, type, gender and age group, were overlapping and therefore results were not independent between categories.

Table 5.5. Means and standard deviations (SD) for motivational benefit factors and Motivational Fulfilment Index (MFI) by demographic categories and volunteer types (study 2).

Category	n	V benefit	U benefit	S benefit	P benefit	C benefit	Mean benefit	MFI
All volunteers	394-422	5.25 (1.30)	5.01 (1.50)	4.13 (1.20)	3.44 (1.56)	2.64 (2.00)	4.06 (1.13)	6.71 (3.91)
Volunteer period								
Current	306-327	5.19 (1.31)	5.00 (1.50)	4.14 (1.20)	3.49 (1.54)	2.55 (1.98)[a]	4.06 (1.10)	6.70 (3.87)
Former	88-95	5.44 (1.24)	5.04 (1.49)	4.09 (1.19)	3.29 (1.63)	2.99 (2.00)[b]	4.09 (1.20)	6.72 (4.01)
Volunteer types								
BM	89-94	5.15 (1.27)	4.99 (1.50)[a]	3.78 (1.25)[a]	3.11 (1.54)[a]	2.78 (2.06)	3.87 (1.19)	6.31 (3.94)
BMPC	95-105	5.29 (1.15)	5.66 (1.20)[b]	4.27 (1.17)[b]	3.49 (1.55)[ab]	2.94 (2.10)	4.28 (1.08)	7.44 (3.66)
PC	138-149	5.16 (1.36)	5.03 (1.31)[a]	4.13 (1.12)[ab]	3.44 (1.47)[ab]	2.32 (1.75)	3.98 (1.04)	6.51 (4.10)
Other	72-78	5.47 (1.36)	4.13 (2.75)[c]	4.37 (1.22)[b]	3.80 (1.68)[b]	2.71 (2.11)	4.15 (1.18)	6.58 (3.61)
Gender								
Female	204-223	5.33 (1.30)	5.21 (1.54)[a]	4.10 (1.17)	3.55 (1.52)	2.98 (2.08)[a]	4.19 (1.10)[a]	6.61 (3.78)
Male	189-200	5.15 (1.30)	4.79 (1.42)[b]	4.17 (1.24)	3.34 (1.60)	2.26 (1.82)[b]	3.92 (1.13)[b]	6.81 (4.03)
Age								
Up to 34	61-64	5.38 (1.30)	5.16 (1.46)	4.36 (1.07)	4.06 (1.43)[a]	5.04 (1.76)[a]	4.73 (1.13)[a]	6.48 (3.92)
35-49	52-55	5.20 (1.21)	5.39 (1.45)	3.95 (1.26)	3.67 (1.66)[ab]	4.07 (2.01)[a]	4.40 (1.10)[ab]	6.24 (3.72)
50-64	136-147	5.36 (1.23)	5.01 (1.60)	4.22 (1.21)	3.48 (1.55)[b]	2.06 (1.55)[b]	4.02 (1.03)[b]	6.91 (3.84)
65 and over	142-154	5.10 (1.38)	4.81 (1.41)	4.01 (1.20)	3.07 (1.49)[b]	1.67 (1.19)[b]	3.69 (1.05)[c]	6.79 (4.01)

Note: Different superscripts in columns (within category) indicate significantly different means at $p<0.05$. V: 'values', U: 'understanding', S: 'social', P: 'protective', C: 'career'.

5.3.2 How do volunteer motivations, motivational benefits and fulfilment and volunteers' sense of well-being relate?

5.3.2.1 How do levels of volunteer motivation relate to volunteers' sense of well-being (study 1)?

Correlation between volunteers' day-specific motivation and their general well-being measured before volunteering as well as correlation between general motivation and volunteer-related well-being measured after volunteering were investigated in study 1. There were no significant differences between biodiversity monitoring and practical conservation volunteers in mean levels of general or activity-related well-being (chapter 4, section 4.3.1.3). Similarly, there were no differences in mean levels of day-specific (mean=6.13, *SD*=0.93; U=6437, p>0.56) or general (mean=6.22, *SD*=0.82; U=5381, p>0.70) motivation between the two groups of environmental volunteers and they were therefore grouped for this analysis. There was a significant positive correlation between levels of day-specific and general motivation for volunteering (r=0.63, p<0.001). Before volunteering, there were significant positive correlations between volunteers' level of day-specific motivation and all positive indices of volunteers' well-being generally in life (r ranged from 0.16 to 0.37, p<0.05; Table 5.6a) , except 'health'. There were no significant correlations between volunteers' day-specific motivation and negative indices of well-being generally in life (p>0.55). A similar pattern was found after volunteering with significant positive correlations between volunteers' general level of motivation to volunteer and all positive well-being indices of volunteer-related well-being (r ranged from 0.32 to 0.59, p<0.001; Table 5.6b). Again, level of motivation in general was not significantly correlated with negative well-being indices (p>0.33).

Table 5.6. Zero-order correlations between a) volunteers' level of day-specific motivation and their general level of well-being (measured before volunteering), and b) volunteers' level of motivation generally for volunteering and their volunteering-related well-being (measured after volunteering) (study 1).

a)	**General sense of well-being at the start of the day**								**Satisfaction with life**
	Engagement	Relationship	Meaning	Health	Negative emotions	Loneliness	Happy	Overall well-being	
Level of day-specific motivation	0.37***	0.16*	0.29***	0.08	-0.04	-0.02	0.19**	0.26***	0.22***

b)	**Sense of well-being during volunteering**								**Satisfaction with volunteer experience**
	Engagement	Relationship	Meaning	Health	Negative emotions	Loneliness	Happy	Overall well-being	
Level of motivation generally for volunteering	0.55***	0.48***	0.56***	0.32***	-0.05	-0.12	0.57***	0.59***	0.59***

Note: For a) n=212-223 and b) n=193-203, due to some missing values.

* p<0.05, ** p<0.01, *** p<0.001

5.3.2.2 What are the synergies between motivations, motivational benefits and fulfilment and volunteering-related well-being for current volunteers (study 2)?

The results are based on current volunteers' responses to items about their volunteer motivation, motivational benefits and their volunteering-related well-being. All correlations between motivational factors and motivational benefit factors were positive and highly significant (r ranged from 0.15 to 0.92, $p<0.01$; Table 5.7), except for the correlation between the 'recreation' factor and the 'career' benefits factor ($p>0.46$). Similarly, all positive well-being indices, 'engagement', 'relationship', 'meaning', 'health', 'happiness' and 'overall well-being', as well as satisfaction were positively and significantly correlated with all motivational and motivational benefit factors (r ranged from 0.15 to 0.43, $p<0.05$), except the 'protective' and 'career' motivational and motivational benefit factors. The 'protective' motivation and motivational benefit factors were not correlated with 'health' ($p>0.14$) but were significantly correlated with all other positive elements (r ranged from 0.13 to 0.41, $p<0.05$). The 'career' motivation and motivational benefit factors were only significantly correlated with one positive well-being index, the 'engagement' element (r ranged from 0.14 to 0.15, $p<0.05$). Of the negative well-being indices, 'negative emotions' were significantly negatively correlated with 'recreation' motivation ($r=-0.17$, $p<0.01$) and significantly positively correlated with 'protective' and 'career' motivations and with the 'protective' and 'career' motivational benefit factors (r ranged from 0.14 to 0.24, $p<0.05$). 'Loneliness' was the well-being element significantly correlated with the fewest other factors, only being significantly positively correlated with 'protective' motivation ($r=0.12$, $p<0.05$) and 'protective' motivational benefit ($r=0.24$, $p<0.05$).

Table 5.7. Correlations between volunteer motivational factors, motivational benefit factors, Motivational Fulfilment Index (MFI) and volunteer-related well-being elements for current volunteers (study 2).

	Volunteer motivation factors							Volunteer motivational benefit factors						
Variables	**V**	**U**	**R**	**S**	**P**	**C**	**MMS**	**V benefit**	**U benefit**	**S benefit**	**P benefit**	**C benefit**	**MMBS**	**MFI**
Volunteer motivational benefit factors														
V benefit	0.60***	0.43***	0.15**	0.37***	0.48***	0.19***	0.55***							
U benefit	0.41***	0.42***	0.43***	0.24***	0.34***	0.28***	0.59***	0.38***						
S benefit	0.44***	0.39***	0.24***	0.55***	0.54***	0.22***	0.60***	0.47***	0.27***					
P benefit	0.35***	0.40***	0.21***	0.44***	0.76***	0.36***	0.59***	0.49***	0.32***	0.57***				
C benefit	0.24***	0.42***	0.04	0.15**	0.29***	0.92***	0.56***	0.21***	0.32***	0.29***	0.40***			
MMBS	0.55***	0.59***	0.27***	0.49***	0.70***	0.60***	0.80***	0.67***	0.61***	0.70***	0.84***	0.66***		
MFI	0.05	0.03	0.04	-0.08	0.06	0.14*	0.10	0.44***	0.39***	0.26***	0.35***	0.22***	0.45***	
Volunteer well-being elements														
Engagement	0.40***	0.41***	0.35***	0.31***	0.41***	0.14*	0.53***	0.42***	0.37***	0.34***	0.28***	0.15**	0.41**	0.07
Relationship	0.31***	0.27***	0.16**	0.30***	0.20***	-0.01	0.33***	0.30***	0.19***	0.39***	0.13*	0.03	0.25***	0.08
Meaning	0.43***	0.34***	0.11'	0.24***	0.23***	0.00	0.36***	0.42***	0.25***	0.34***	0.20***	0.04	0.31***	0.07
Health	0.15**	0.26***	0.20***	0.16**	0.08	0.01	0.21***	0.20***	0.22***	0.17**	0.04	0.02	0.15**	0.10
Negative emotions	0.02	0.03	-0.17**	-0.01	0.14*	0.22***	0.06	0.00	-0.02	0.01	0.24***	0.23***	0.18**	0.02
Loneliness	0.03	0.03	-0.05	-0.01	0.12*	0.11'	0.05	-0.02	-0.01	-0.02	0.24***	0.09	0.13*	0.03
Happy	0.31***	0.25***	0.33***	0.27***	0.30***	-0.06	0.33***	0.26***	0.24***	0.32***	0.22***	-0.04	0.25***	0.01
Overall well-being	0.36***	0.34***	0.29***	0.29***	0.24***	-0.02	0.39***	0.38***	0.28***	0.35***	0.14*	0.02	0.28***	0.09
Satisfaction	0.35***	0.26***	0.26***	0.23***	0.19***	-0.04	0.34***	0.31***	0.24***	0.32***	0.13*	-0.01	0.23***	0.06

Note: n= 293-329 due to some missing values. V: 'values', U: 'understanding', R: 'recreation', S: 'social', P: 'protective', C: 'career', MMS: Mean Motivational Score, MMBS: Mean Motivational Benefit Score.

' p<0.06, * p<0.05, ** p<0.01, *** p<0.001

5.3.2.3 What are the synergies between motivations, motivational benefits and fulfilment and general level of well-being for former volunteers (study 2)?

Results reported here are based on former volunteers' responses to items about their motivation for previously volunteering and the motivational benefits gained previously as well as their current general level of well-being. All correlations between motivational factors and motivational benefit factors were positive and significant (r ranged from 0.23 to 0.87, $p<0.05$; Table 5.8), except for the correlation between the 'recreation' factor and the 'career' benefits factor ($r=0.20$, $p<0.06$). The Motivational Fulfilment Index (MFI) was negatively correlated with all motivational factors and significantly so with the 'understanding' ($r=-0.28$, $p<0.01$) and 'career' ($r=-0.22$, $p<0.05$) factors. It was positively correlated with the 'values', 'understanding' and 'social' benefit factors (r ranged from 0.21 to 0.35, $p<0.05$). Most motivation and motivational benefits factors were correlated with only one, two or three of the seven well-being elements. The 'protective' motivation factor was significantly correlated with 'relationships' ($r=-0.27$, $p<0.05$) and 'negative emotions' and 'loneliness' (r ranged from 0.23 to 0.28, $p<0.05$). The most highly significant correlation was between the motivational 'values' factor and 'meaning' ($r=0.31$, $p<0.01$). The motivational benefit factors that significantly correlated with most well-being elements were the 'values' benefit factor correlated with 'engagement', 'meaning', 'happiness' and satisfaction (r ranged from 0.32 to 0.46, $p<0.01$) and the 'understanding' benefit factor correlated with 'engagement', 'relationship' and 'meaning' (r ranged from 0.23 to 0.26, $p<0.05$). The MFI was positively correlated with all positive indices of well-being and significantly so with 'happiness' ($r=0.27$, $p<0.05$), and it was negatively correlated with negative indices of well-being and significantly so with 'negative emotions' ($r=-0.24$, $p<0.05$).

Table 5.8. Correlations between volunteer motivational factors, motivational benefit factors, Motivational Fulfilment Index (MFI) and current general level of well-being for former volunteers (study 2).

	Volunteer motivation factors							Volunteer motivational benefit factors						
Variables	**V**	**U**	**R**	**S**	**P**	**C**	**MMS**	**V benefit**	**U benefit**	**S benefit**	**P benefit**	**C benefit**	**MMBS**	**MFI**
Volunteer motivational benefit factors														
V benefit	0.59***	0.42***	0.25*	0.38***	0.35***	0.29**	0.55***							
U benefit	0.41***	0.49***	0.45***	0.25*	0.39***	0.38***	0.60***	0.53***						
S benefit	0.46***	0.30**	0.23*	0.52***	0.62***	0.27*	0.57***	0.53***	0.38***					
P benefit	0.40***	0.35***	0.33***	0.47***	0.79***	0.39***	0.64***	0.45***	0.44***	0.71***				
C benefit	0.32**	0.49***	0.20'	0.25*	0.42***	0.87***	0.61***	0.28**	0.44***	0.38***	0.48***			
MMBS	0.57***	0.54***	0.39***	0.48***	0.73***	0.61***	0.79***	0.67***	0.70***	0.78***	0.86***	0.71***		
MFI	-0.19	-0.28**	-0.16	-0.11	-0.05	-0.22*	-0.20	0.35***	0.21***	0.22*	0.16	-0.04	0.20	
General well-being elements														
Engagement	0.13	0.08	0.30**	0.13	0.01	0.07	0.21	0.43***	0.24*	0.19	0.04	0.09	0.21	0.18
Relationship	0.11	0.00	0.04	0.01	-0.27*	-0.12	-0.01	0.19	0.23*	0.13	-0.24*	-0.09	-0.02	0.15
Meaning	0.31**	0.13	0.21	0.08	0.05	0.00	0.23'	0.46***	0.26*	0.34**	0.01	0.03	0.22	0.22
Health	0.13	-0.05	0.29*	0.13	0.02	0.09	0.16	0.20	0.18	0.07	0.01	0.02	0.08	0.04
Negative emotions	0.08	0.24*	0.02	0.11	0.23*	0.29*	0.17	-0.08	0.07	0.05	0.19	0.26*	0.20	-0.24*
Loneliness	-0.06	0.09	-0.04	-0.09	0.28*	0.10	0.10	-0.17	-0.06	-0.05	0.29*	0.06	0.11	-0.06
Happy	0.15	-0.04	0.14	0.07	-0.11	-0.02	0.06	0.36**	0.18	0.17	-0.09	0.04	0.10	0.27*
Overall well-being	0.14	-0.04	0.21	0.08	-0.14	-0.07	0.09	0.37**	0.22	0.18	-0.12	-0.05	0.07	0.24*
Satisfaction	0.15	-0.03	0.20	0.10	-0.08	-0.10	0.06	0.32**	0.21'	0.14	-0.09	-0.03	0.07	0.23'

Note: n= 68-95 due to some missing values. V: 'values', U: 'understanding', R: 'recreation', S: 'social', P: 'protective', C: 'career', MMS: Mean Motivational Score, MMBS: Mean Motivational Benefit Score.

' p<0.06, * p<0.05, ** p<0.01, *** p<0.001

5.3.2.4 What are the synergies between volunteer motivations and general level of well-being for potential volunteers (study 2)?

As potential volunteers had not volunteered, they were not asked to evaluate their motivational benefits from volunteering, hence only motivations and general well-being are presented. Most motivational factors were not correlated with any elements of potential volunteers' general level of well-being (Table 5.9). Similarly to former volunteers, the 'values' factor was positively and significantly correlated with 'meaning' ($r=0.29$, $p<0.05$) and the 'protective' factor was positively and significantly correlated with 'negative emotions' ($r=0.39$, $p<0.05$) and 'loneliness' ($r=0.31$, $p<0.05$).

Table 5.9. Correlations between volunteer motivational factors and current general level of well-being for potential volunteers (study 2).

	Volunteer motivation factors						
Variables	**Values**	**Understanding**	**Recreation**	**Social**	**Protective**	**Career**	**MMS**
General well-being elements							
Engagement	0.15	-0.08	-0.01	0.16	0.01	0.17	0.03
Relationship	0.17	-0.12	-0.02	0.01	0.01	0.01	0.00
Meaning	0.29*	-0.08	-0.17	0.19	-0.18	0.05	0.08
Health	0.25	0.03	0.06	0.22	-0.01	0.22	0.23
Negative	-0.06	0.12	0.07	0.04	0.39**	0.03	0.09
Loneliness	-0.16	0.14	0.21	0.08	0.31*	-0.06	0.10
Happy	0.24	-0.15	-0.08	0.19	-0.18	0.08	0.05
Overall well-being	0.16	-0.16	-0.13	0.09	-0.24	0.06	-0.02
Satisfaction	0.22	-0.11	-0.11	0.21	-0.27'	-0.02	-0.02

Note: n= 45-63 due to some missing values. V: 'values', U: 'understanding', R: 'recreation', S: 'social', P: 'protective', C: 'career', MMS: Mean Motivational Score.
' p<0.06, * p<0.05, ** p<0.01, *** p<0.001

5.3.3 Current volunteers: How do volunteer motivations and the fulfilment of motivations predict volunteers' sense of well-being during volunteering?

5.3.3.1 How does level of volunteer motivation predict volunteer well-being during volunteering (study 1)?

Linear regression indicated that day-specific motivation was a significant predictor of all positive elements of volunteer-related well-being (B ranged from 1.47 to 3.55, $p<0.01$; Table 5.10), though it was not a significant predictor of 'negative emotions' or 'loneliness' ($p>0.05$). It explained between 4% ('health') and 21% ('engagement') of the variability in volunteer-related well-being elements.

Table 5.10. Linear regression showing volunteer-related well-being elements regressed on level of day-specific motivation (study 1).

Variable	Level of day-specific motivation	t(df)	R^2
Engagement	2.72***	4.97(193)	0.19
Relationship	2.45***	6.55(198)	0.10
Meaning	3.38***	2.76(194)	0.17
Health	1.47**	-1.44(194)	0.04
Negative emotions	-0.65	-1.52(198)	0.02
Loneliness	-0.91	7.06(194)	0.02
Happy	3.55***	7.06(191)	0.18
Overall well-being	2.36***	7.53(201)	0.20
Satisfaction	3.21***	6.23(194)	0.15

Note: n=193-203 due to some missing values.
** p<0.01, *** p<0.001

5.3.3.2 How do volunteer motivational factors and the fulfilment of motivation predict volunteers' sense of well-being during volunteering for current volunteers?

Hierarchical regression results highlighted how motivational factors differently contributed to predicting different elements of volunteer well-being (Table 5.11). For positive well-being indices, 'engagement', 'relationship', 'meaning', 'health', 'happiness' and 'overall well-being', the motivational factors of 'values' and 'understanding' were always significant positive predictors in the models (B ranged from 0.83 to 1.98, p<0.01) except for 'health' where the 'values' factor was not significant (p>0.05). The motivational 'recreation' factor was also a significant positive predictor in most positive well-being indices models (B ranged from 0.60 to 1.17, p<0.01), except for 'relationship' and 'meaning' (p>0.05). 'Social' motivation was only significant in the model for 'relationship' (B=0.80, p<0.05), and 'protective' motivation was only significant in the 'engagement' (B=0.59, p<0.05) and 'health' (B=-0.72, p<0.05) models. All these motivational factors, 'values', 'understanding', 'recreation', 'social', and 'protective', were positive predictors in the models, except for 'protective' motivational factor in the 'health' model (B=-0.72, p<0.05), whereas 'career' motivation had negative coefficients for all positive well-being indices and significantly so for 'relationship', 'meaning' and 'health' (B ranged from -0.81 to -0.41, p<0.05). Models of positive well-being indices explained between 11% ('health') and 28% ('engagement'). Adding the Motivational Fulfilment Index (MFI) to the models significantly improved models for 'meaning', 'health' and 'overall well-being' (p<0.05).

For the negative indices of well-being, 'recreation' (B=-0.86, p<0.001), 'protective' (B=0.95, p<0.001) and 'career' (B=0.59, p<0.001) motivations were significant in predicting 'negative emotions' (p<0.05) and explained 13%. For 'loneliness', only the 'protective' motivation was

significant in the model (B=1.24, $p<0.01$) and the overall model explained only 5% of the variability. For the negative well-being indices models, 'loneliness' and 'negative emotion', adding the MFI to the models did not significantly improve them ($p>0.05$).

Table 5.11. Hierarchical regression showing volunteer-related well-being elements regressed on motivational factors (step 1) and Motivational Fulfilment Index (MFI) (step 2) for current volunteers (study 2).

Variable	Engagement	Relationship	Meaning	Health	Negative emotions	Loneliness	Happy	Overall well-being	Satisfaction
n	298	294	298	294	296	296	293	292	300
Step 1									
Values (B)	0.83**	1.19**	1.98***	0.45	-0.24	-0.22	1.23**	0.93***	1.47***
Understanding (B)	1.22***	1.24**	1.70***	1.74***	-0.49	-0.37	1.31**	1.19***	1.19**
Recreation (B)	0.78***	0.21	-0.05	0.75**	-0.86***	-0.50	1.17***	0.60***	0.82***
Social (B)	-0.09	0.80*	0.08	0.31	-0.13	-0.46	0.05	0.27	0.23
Protective (B)	0.59*	-0.33	-0.02	-0.72*	0.95***	1.24**	0.49	-0.23	-0.25
Career (B)	-0.14	-0.41*	-0.65**	-0.31	0.59***	0.37	-0.81***	-0.43**	-0.61**
R^2	0.28	0.16	0.22	0.11	0.13	0.05	0.21	0.24	0.18
Step 2									
MFI (B)	0.25	0.42'	0.43'	0.49*	-0.06	0.03	0.14	0.32*	0.34
R^2	0.28	0.17	0.23	0.12	0.13	0.05	0.21	0.25	0.18
R^2 change	0.00	0.01'	0.01*	0.01*	0.00	0.00	0.00	0.01*	0.00

Note. B: unstandardized coefficients.

' p<0.06, * p<0.05, ** p<0.01, *** p<0.001

5.4 Discussion

Overall, there were clear associations between volunteers' motivations, motivational benefits and fulfilment, and volunteers' well-being and satisfaction. Women and younger volunteers gained higher motivational benefits from their volunteering, and different types of volunteers gained different motivational benefits. Supporting previous research (Stukas et al. 2016a), results also showed that volunteers with the other-oriented 'values', 'understanding' and 'social' motivations, had higher levels of well-being and satisfaction than volunteers with self-oriented 'career' motivation. However, also volunteers with the self-oriented 'recreation' and 'protective' motivations had higher levels of well-being and satisfaction than volunteers with 'career' motivation. Motivational fulfilment had a positive impact on volunteer well-being over and above motivations alone, also supporting previous research (Clary et al. 1998; Stukas et al. 2009). Extending this knowledge, results showed that former volunteers' motivations, specifically 'understanding' and 'career' motives, had not been fulfilled whereas current volunteers' motivations were more likely to have been fulfilled. This section will further discuss these points.

5.4.1 The motivational benefits gained by different demographic groups and types of volunteers

Whereas several previous studies have presented findings on the motivational factors of different demographic or volunteer groups (e.g. Clary et al. 1996; Okun and Schultz 2003; Stukas et al. 2016a), no studies have presented findings on the motivational benefits of those different groups. In this study, important differences in motivational benefits were revealed for different types of volunteers, highlighting areas for possible improvement to ensure volunteer motivational fulfilment for all groups of volunteers. Women and younger volunteers rated their motivational benefits higher overall than men and older volunteers, respectively. For example, 'career' motivational benefits were rated lower by men and decreased with age, reflecting a similar pattern for 'career' motives themselves (chapter 3 section 3.1.4, Okun and Schultz 2003; Ho et al. 2012; Currie et al. 2016). Volunteers have been shown to prefer tasks with benefits that will meet their motivations (Clary et al. 1998; Houle et al. 2005), which is likely what happened in this study where younger volunteers, being motivated to further their careers, sought and gained higher 'career' benefits. Former volunteers gained more 'career' benefits than current volunteers, reflecting that they had higher 'career' motivations than current volunteers as well (as found in chapter 3, section 3.3.3). However, it has been suggested that 'career' motivations may become satiated when volunteers have developed the

skills they wanted or met the contacts that enable them to get a job (Stukas et al. 2016b), which could lead volunteers to leave their volunteer roles.

Also different types of volunteers rated their motivational benefits differently. Environmental volunteers gained higher 'understanding' benefits than non-environmental volunteers, even though non-environmental volunteers scored their 'understanding' motivations as highly as environmental volunteers, except practical conservation volunteers (as found in chapter 3, section 3.3.3). This suggests that non-environmental volunteers may not get their 'understanding' motivation fulfilled to the same level as environmental volunteers. Among the environmental volunteers, biodiversity monitoring volunteers also performing practical conservation work rated the 'understanding' benefit highest which suggests that getting involved in multiple different activities can increase the learning outcomes of volunteering. However, low motivational benefit ratings for certain motivations may not lead to unhappy or unsatisfied volunteers if motivation ratings are equally low. In this research, biodiversity monitoring volunteers reported less 'social' benefits than non-environmental volunteers, but as their 'social' motivations were also lower than non-environmental volunteers' motivations, this may not be an issue. The lower 'social' motivations and motivational benefits gained by biodiversity monitoring volunteers is possibly due to the often more solitary pursuit that biological recording is, with participants usually having individual recorder IDs (e.g. Boakes et al. 2016), rather than the recording being a group pursuit.

5.4.2 Synergies between volunteers' motivations, motivational benefits and fulfilment and their well-being

When evaluating the association between volunteer well-being and volunteer motivations, previous studies have treated well-being as a single factor, choosing to combine various positive items (Stukas et al. 2016a) or both positive and negative affect items into one measure (Stukas et al. 2009). This approach may obscure the differential interactions between motivations and positive versus negative well-being indices found in this chapter. Here it is discussed how using multidimensional approaches to both motivation and well-being provides a deeper understanding of the synergies between the two.

Overall, current volunteers with higher motivations and motivational benefits also reported higher levels of satisfaction, supporting previous research (Clary et al. 1996; Finkelstein 2008b), and extending current knowledge, these volunteers also reported higher levels of positive well-being indices in terms of 'engagement', 'relationships', 'meaning' and

'happiness', except for volunteers with 'career' motivations. People volunteering to gain career benefits may feel pressured to volunteer in order to obtain skills or get a foot in the door where they would like to work, and Weinstein and Ryan (2010) found that 'controlled' motivation, rather than autonomous motivation with a free choice, lead to lower levels of positive affect, which could be the reason for the results presented here. 'Career' motivation and motivational benefit factors were only associated with the 'engagement' element of well-being, suggesting that career-focused volunteers do choose activities they are interested in and are able to become absorbed in. Former volunteers with 'recreation' motivations, which includes being outdoors and getting exercise, also reported higher levels of 'engagement' generally in life, and with the original 'flow' theory of getting fully absorbed in activities being based on outdoor pursuits like surfing (Csikszentmihalyi 1975, 1991), this association would suggest an underlying relationship not limited to volunteering.

Another seemingly underlying relationship found in both former and potential future volunteers was between the 'values' motivation and the well-being element of 'meaning' generally in life, suggesting these people have a strong sense of their own values and beliefs and generally do things in life corresponding to these values and beliefs, creating meaning in their lives. The positive effect of this is obvious for former volunteers reporting higher levels of 'values' motivational benefits as they also report higher levels of many well-being elements generally in life, i.e. 'engagement', 'meaning', 'happiness' and 'overall well-being'. For 'happiness' and 'overall well-being' this carries over to a positive association with motivational fulfilment (MFI), suggesting that it is the fulfilment of the 'values' motivation rather than just having the 'values' motivation that is important for the well-being of volunteers. For current volunteers, 'meaning' was only weakly related to the motivational 'recreation' factor, suggesting that current volunteers looking for recreation as part of their volunteer experience were focused more on the hedonic, or pleasant, aspects of well-being than eudaimonic, or purposeful, aspects. The lack of association between 'recreation' motivation and 'career' motivational benefits for both current and former volunteers further supported this.

The level of day-specific motivation was not associated with current volunteers' sense of 'health' generally in life, though former volunteers with 'recreation' motivations, did have an increased level of 'health' generally in life. These findings contradict previous research showing health benefits, such as decreased mortality, only in volunteers with other-oriented motivations (Konrath et al. 2012), suggesting that people with the self-directed 'recreation' motivation, primarily environmental volunteers, may also gain health benefit from volunteering. As mortality is likely an effect accumulated over the long-term, the positive

effect on general health may have been too small to measure or have been obscured by measuring motivation as a unidimensional construct in study 1. However, also Ho et al. (2012) reported increased 'health' benefits of volunteers with both other-oriented 'values' and 'understanding' motivations as well as self-directed 'protective' motivations, though their health measure was a combination of general health and volunteering-related health. In both studies 1 and 2, volunteers' general and overall motivation, respectively, were positively associated with their volunteering-related 'health', and similarly to Ho et al. (2012), 'values' and 'understanding' motivations were associated with better health, though also 'recreation' and 'social', but not 'protective' or 'career', motivations were associated with better health.

The negative indices of well-being, 'loneliness' and 'negative emotions', were generally associated with 'career' and 'protective' motivations. Low self-esteem has been shown to lead to higher levels of loneliness (Nurmi et al. 1997), and in this study there was also a positive relationship between 'protective' motivations, which includes desires to improve self-esteem, and how lonely volunteers felt during volunteering. However, this relationship was stronger between 'protective' motivation and general well-being of former volunteers and stronger again for potential future volunteers. This supports the hypothesis that there is a relationship between the two, but it also suggests that volunteering has a positive effect on the relationship not only through decreasing the strength of the relationship but also through providing substantial 'protective' motivational benefits as indicated by both current and former volunteers.

People volunteering for 'protective' reasons also had increased levels of 'negative emotions', and again the effect was smaller during volunteering than generally in life for former or potential future volunteers; however, former volunteers did not report the same level of 'protective' motivational benefits as current volunteers did, suggesting that the effect of volunteering on the level of 'negative emotions' subsides over time and volunteering needs to be continuous to sustain the positive effect. On the other hand, people volunteering for 'career' reasons, both current and former volunteers, also had higher levels of 'negative emotions', but these volunteers also reported higher levels of 'career' benefits, suggesting that the 'career' benefits may be lasting benefits of volunteering, such as people having learned new skills or made the contacts to get a new job.

The 'recreation' motivational factor, which encompasses spending time outdoors and getting exercise, was the only factor negatively related to 'negative emotions' for current volunteers, which supports the extensive research documenting that spending time outdoors is good for

human well-being, including having positive effects on mental health issues such as depression (Townsend 2006; Pillemer et al. 2010; Korpela et al. 2016). However, this was not a lasting effect, as 'recreation' motivation did not relate to former volunteers' level of 'negative emotions' generally in life, suggesting that volunteering again must be sustained to gain certain well-being benefits.

No other-oriented motivations were related to either 'negative emotions' or 'loneliness' in current volunteers; however, former volunteers reporting higher 'understanding' motivations also had higher 'negative emotions', as was the case with 'career' motivations. One potential reason for these increased negative emotions generally in life could stem from a 'focusing illusion' (Schkade and Kahneman 1998), as respondents had answered questions on their motivations and motivational benefits previous to being asked about their well-being generally in life. The focusing illusion makes topics that are being focused on seem much more important than they otherwise are (Schkade and Kahneman 1998). In this study, former volunteers had just rated how important their 'understanding' and 'career' motivations were, as well as how well these motivations had been fulfilled. The MFI was negatively related with these two motivations, showing that volunteers with high 'understanding' or 'career' motivations had lower motivational fulfilment, which, through the focusing effect, could lead former volunteers to report more negative emotions even though they were not asked about their volunteer well-being but about their well-being generally in life. The focusing effect is further supported by former volunteers having a high MFI also having fewer 'negative emotions'. Overall, the MFI was negatively related to all motivational factors of former volunteers but not of current volunteers, where there even was a positive relationship between MFI and 'career' motivations. This supports previous research, where high volunteer motivations were found to lead to high drop-out rates (Pushkar et al. 2002). Findings here show how volunteers who did not get their motivations, especially 'understanding' and 'career' motivations, fulfilled had left their volunteer roles, even though it has been suggested that less motivated or satisfied volunteers would spend less time volunteering but still remain in their roles (Finkelstein 2007).

5.4.3 How current volunteers' motivations and their fulfilment of motivations predict their sense of volunteering-related well-being

Volunteers with a high level of day-specific motivation went on to be more engaged, have better relationships, see volunteering as more meaningful, be happier, gain better health and be more satisfied with the volunteer experience (study 1), but this effect of overall level of

motivation concealed very different effects of the motivational factors on the various elements of well-being (study 2). This supports investigating motivation as well as well-being as multidimensional constructs. In one previous study, the overall motivation score was found not to predict positive affect or satisfaction (Stukas et al. 2009), contrary to results presented in this chapter. Similarly to findings by Gillath et al. (2005), volunteers motivated by their 'values' experienced better personal relationships; however, this study also found that 'understanding' and 'social' motivations were positive predictors of good relationships, whereas 'career' motivations were a negative influence, again highlighting the importance of investigating motivation as a multidimensional construct. Supporting previous research (Stukas et al. 2016a), 'values' motivations were also important in predicting all other positive indices of well-being, except 'health', highlighting the strong relationship between altruistic motivations and the positive impact of volunteering on human well-being. The 'understanding' motivation was also a significant predictor of all positive indices of well-being, supporting Stukas et al. (2016a), but contradicting other previous research which found it was a negative predictor of volunteer satisfaction (Güntert et al. 2015) and was not a predictor of volunteer 'health' (Ho et al. 2012). In the same study by Ho et al. (2012), the 'protective' motive score was a positive predictor of volunteer health, whereas it was a negative predictor in this study. Previously, self-oriented motives were found to be associated with poorer outcomes (Stukas et al. 2016b), which was supported for 'career' motivations especially, but also somewhat for 'protective' motivations, though not for 'recreation' motives which had a positive influence on volunteer well-being.

Contrary to the effect of day-specific motivation on positive indices of well-being, there was seemingly no effect on the negative indices of well-being, 'negative emotions' and 'loneliness', during volunteering (study 1); however, again investigating the different motivational factors showed that some factors did have an influence on volunteers' negative emotions and loneliness (study 2). Loneliness during volunteering was only predicted by volunteers' 'protective' motivations, not any other motivation, and so people who volunteered because they wanted to feel better about themselves and escape the problems of daily life felt more lonely during volunteering. Previously, loneliness had been found to also be positively influenced by 'values' motivations (Gillath et al. 2005), though that was not the found in this study. Predicting volunteers' 'negative emotions' during volunteering was only influenced by self-directed motivations, though 'recreation' motives worked to counteract the negative effect of 'protective' and 'career' motivations. The results show for the first time that a self-oriented motivation, 'recreation', can lead to higher levels of well-being by lowering 'negative emotions'. This positive influence would have a larger effect on environmental volunteers than

non-environmental volunteers, as the 'recreation' motivation is more important to them (as found in chapter 3, section 3.3.3); however, the 'recreation' motivations in this research were focused on being outdoors and getting exercise, which are more relevant to environmental than other volunteers. Further research should be encouraged to identify 'recreation'-type motivations for non-environmental volunteers that could be fulfilled and thereby have the same positive effect on their well-being.

Motivational fulfilment was found to be important to the volunteers' experience of meaning, health and overall well-being during volunteering, similarly to findings by Stukas et al. (2009) where their Total Match Index (TMI) predicted positive affect in volunteers. However, contrary to the TMI from Stukas et al. (2009), the MFI did not add predictive effect for negative indices of well-being, possibly due to the positive correlations between and strong influence of 'protective' and 'career' motivation and motivational benefits on the negative indices, as well as 'career' motivated volunteers having higher motivational fulfilment.

5.4.4 Implications

As not all volunteer activities can offer opportunities for fulfilment of all motivations (Clary et al. 1996), understanding volunteers' motivations is important for organisations to facilitate a good volunteer-task match (Finkelstein 2008b), ensure motivational fulfilment, volunteer well-being and satisfaction and thereby increase volunteer retention (Clary et al. 1998). Assessing volunteer motivation, motivational benefits and well-being using multidimensional constructs, such as the VFI and the PERMA-Profiler, provide nuanced information on areas for improvement for volunteer organisations to focus their efforts on to retain their current volunteers. In general, it seems organisations may wish to focus on ensuring men and older volunteers gain the motivational benefits they aim for, as they reported less motivational benefits than women and younger volunteers. This research highlighted how especially 'understanding' and 'career' motivational fulfilment was important for retention of volunteers and organisations may wish to implement an entry survey exploring motivations of new volunteers to enable better fulfilment of motivations from the start. To increase fulfilment of 'understanding' motivations, volunteer organisations could offer a range of different tasks and types of volunteering to their volunteers, as volunteers engaging in more than one type of activity reported higher 'understanding' benefits.

5.5 Conclusion

This chapter has shown that 'understanding', 'social' and 'protective' motivational benefits differ between volunteer types, with biodiversity monitoring volunteers reporting lower benefits than most other volunteer types, highlighting a possible area for concern and potential improvement. The study has also shown that all motivation factors, motivational benefit factors and well-being elements are positively related, except for 'career' motivation and motivational benefits and negative elements of well-being, and that fulfilment of 'understanding' and 'career' motivations are necessary to retain volunteers. Furthermore, it has demonstrated that volunteers having other-oriented motives report higher levels of well-being than volunteers having self-oriented motives, who report higher levels of negative emotions. 'Negative emotions' were decreased when volunteers had recreational motives for volunteering, such as spending time outdoors and getting exercise, suggesting that volunteering could be used as a mental health intervention especially if participants' attention can be focused on the recreational aspects of volunteering. This research also extends our current knowledge of the relationship between volunteer motivation, motivational benefits and fulfilment and volunteer well-being by suggesting a new Motivational Fulfilment Index to measure the extent to which volunteer motivations are fulfilled by the benefits volunteers receive from volunteering.

Chapter 6 The importance of volunteer motivations and well-being for achieving conservation activity and outcome goals

Abstract

Many environmental organisations rely on volunteers to achieve their conservation goals but little is known about how volunteers' motivations and their well-being relate to conservation achievement. This chapter aims to investigate the perceived and actual importance of volunteer motivation, motivational fulfilment and well-being for achieving conservation activity and outcome goals as experienced and perceived by volunteers and volunteer managers. Surveys were conducted of practical conservation and biodiversity monitoring volunteers to measure their motivation and volunteering-related well-being as well as their perception of conservation goal achievement. Surveys were also conducted of volunteer managers in practical conservation and biodiversity monitoring to measure their perceptions of volunteer motivation and well-being as well as actual conservation goal achievement. Volunteer motivation and well-being were measured using adapted multidimensional models of the Volunteer Functions Inventory and the PERMA Profiler, respectively. Data were analysed using correlations, generalised linear models and hierarchical regression. Results showed that both volunteers and volunteer managers perceive that volunteer motivation and well-being are important for achieving conservation activity and outcome goals through volunteering. However, when analysing the relationship between volunteers' actual motivations and well-being and volunteer managers' evaluation of the actual conservation activity and outcome goals achieved, there was no such relationship. This chapter highlights a discrepancy between perception and reality in volunteers' and volunteer managers' understanding of how volunteer motivation and well-being affect conservation goal achievement.

6.1 Introduction

Volunteering is important in many respects, generating a wide range of benefits for the organisations engaging volunteers and the causes they work for as well as personal benefits for the volunteers themselves (Piliavin 2003; Salamon et al. 2011; Wilson 2012). Some benefits have been well researched, such as health and well-being benefits to volunteers (chapter 4), but others, such as the direct outcomes of volunteering, have not received the same level of scrutiny, with many organisations only measuring their number of volunteers and volunteer hours, rather than the actual impact of the volunteer activities (Burych et al. 2016). Measuring outcomes and impact may be difficult, but it is necessary to define measurable outcomes of volunteering that can be evaluated and improved upon to ensure the optimum impact of volunteering (Burych et al. 2016). Volunteering itself, and thereby also the outcomes of volunteering, may be influenced by the volunteers themselves, through their motivations and behaviour as well as their sense of well-being during volunteering. The effects of volunteer motivation and motivational benefits on various outcomes of volunteering, such as social capital including generalised trust (Stukas et al. 2005, 2009), sense of community (Stukas et al. 2005) and intention to continue volunteering (Stukas et al. 2005, 2009) have been investigated previously. However, many environmental organisations rely on volunteers to achieve their conservation goals, but there appear to be no studies having previously investigated the connection from volunteers' motivations and well-being to actual conservation achievement. This chapter investigates the perceived and actual importance of volunteer motivation, motivational fulfilment and well-being for achieving conservation activity and outcome goals as perceived and experienced by volunteers and volunteer managers.

6.1.1 Creating and measuring impact from volunteering

Creating impact from volunteer activities is a long-term process and many steps are involved in achieving the desired effect, including inputs, activities, outputs and outcomes (Goldstar 2010) (Figure 6.1). This input-to-impact chain often seems fragmented with different hierarchical organisational levels involved in the different steps. Often the 'Activities' and 'Outputs' steps are completed by volunteer managers and volunteers, with volunteers often only involved at these two levels (personal communication, N. Bergin, volunteer manager, DWT, 15 November 2013). If there is no monitoring of conservation impact or no feedback provided to volunteers, they may become demotivated as they may be unaware of the impact they are having (Roy et al. 2012). Another effect of the fragmented impact-creation process may be that volunteers' perception of outputs and outcomes may vary from the volunteer managers' evaluation of actual outputs and outcomes of the same volunteer activities. This could happen where

volunteers only perceive the steps they are directly involved in, whereas managers may consider the whole impact-creation process.

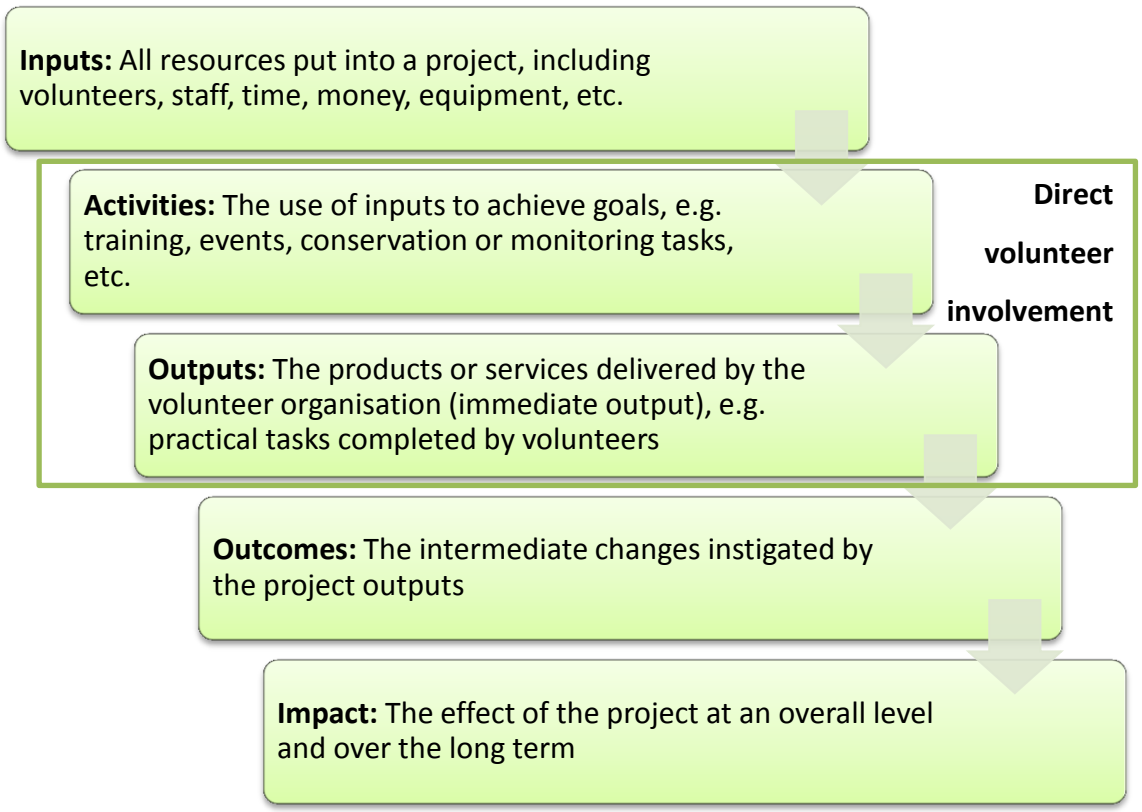


Figure 6.1.The process of creating impact through volunteering, adapted from Goldstar (2010). Volunteer involvement usually happens only at the activities and outputs levels, but the whole process is important in creating lasting impacts.

Impacts of volunteering happen across a wide range of areas, over extended time scales and can be difficult to define and quantify (Goldstar 2010; Roy et al. 2012). Many previous studies have focused on outcomes and impacts of volunteers at the societal and community levels such as increased sustainability and more resilient communities (Ellis and Waterton 2004; Moore et al. 2006; O'Brien et al. 2011), increased social capital (Stukas et al. 2005) and the contribution to the national economy (Smith 2000), or on outcomes for the individual volunteer such as improved skills or knowledge, personal development, improved social networks and increased well-being for the volunteers (Thoits and Hewitt 2001; Lawrence 2006; Measham and Barnett 2008; Raddick and Bracey 2009; Koss and Kingsley 2010; Binder and Freytag 2013; Jenkinson et al. 2013; The Conservation Volunteers 2014). Toolkits are available to help organisations to evaluate these societal outcomes of volunteering, such as the 'Volunteering impact assessment toolkit' (Smith et al. 2015) and the 'International volunteer

impacts survey' (Lough et al. 2009). In contrast, frameworks for measuring direct conservation outputs, outcomes and impact of volunteer activities are often lacking (Harvey et al. 2001).

One suggested framework for measuring direct and indirect conservation outcomes, though not specifically volunteer contributions to this, was developed by the Cambridge Conservation Forum (Kapos et al. 2008). It includes seven categories that directly (species management and site management) or indirectly (research, education, policy, livelihood and capacity building activities) lead to targeted improvements in the status of species, ecosystems or landscapes. This framework was used by Ballard et al. (2016) to evaluate 44 natural history museum citizen science projects and they found that the projects supported conservation both directly through site and species management, and indirectly through research, education and policy impacts. This example shows that evaluation of environmental projects is possible and can demonstrate actual impacts from volunteering.

Practical conservation volunteer activities and outputs are frequently not recorded by conservation organisations (Harvey et al. 2001; Gill 2005) and even when they are it is often only in an informal way (Reidy et al. 2005), making objective evaluations of volunteer impact very difficult. Often conservation outcomes are only monitored over short time periods, for example for the duration of a project and once the project terminates, monitoring also terminates (N. Bergin, volunteer manager, DWT, personal communication, 31 October 2013). In some instances though, a time-limited project can be the beginning of long-term habitat management, even though volunteers may only be involved in the first project phase. An example is the habitat improvement measures implemented in Estonia to restore natterjack toad (*Bufo calamita*) habitat; with the help of 200 volunteers, 66 breeding ponds were restored and toads did return to some ponds before the end of the three and a half year project before the project continued under a national Action Plan (Rannap 2004). In other instances, the project goal may be achieved such as the successful elimination of an invasive species (Chatters 2013a) and the project eventually discontinued. The opposite may also eventuate that the intervention is deemed unsuccessful and subsequently terminated (e.g. Gray and Jones 1977). However, even during unsuccessful interventions, the actual outputs of volunteer activities can be very tangible, such as the removal of 484 tonnes of Japanese wireweed (*Sargassum muticum*) over a four year period (Gray and Jones 1977). Such tangible outputs can signal to the volunteer that conservation goals have been achieved if they are only involved at the 'output' level.

Similarly to practical conservation volunteering, biodiversity monitoring produces very tangible outputs, i.e. the records that volunteers collect. These records have produced significant scientific advances in many fields of ecology, for example ornithology, marine conservation and plant phenology research (Dickinson et al. 2010; Roy et al. 2012; Tulloch et al. 2013; Cigliano et al. 2015; Sullivan et al. 2016). Biodiversity monitoring can provide valuable datasets on large scales, for example baseline data for conservation organisations to prepare management plans and conservation interventions (Silvertown 2009; Scyphers et al. 2014). However, if volunteers are only involved in the data collection phase, they may not be aware of the impact their volunteering has. This may be changing as more citizen science projects become 'co-created', i.e. designed collaboratively between scientists and participants (Roy et al. 2012; Tweddle et al. 2012), allowing volunteers access and potentially better understanding of the whole impact-creating process, including the importance of their data. A previous study has found that data quality, a potential measure of achievement, increase with project participant duration (Thiel et al. 2014). In this way, volunteer motivation and well-being indirectly benefits conservation achievement through the effect it has on volunteers' propensity to continue volunteering.

6.1.2 Aim and research questions for this chapter

The aim of this chapter was to investigate the perceived and actual importance of volunteer motivation, motivational fulfilment and well-being for achieving conservation activity and outcome goals as perceived and experienced by volunteers and volunteer managers. The research questions addressing this aim were:

1) How are actual volunteer motivation, motivational benefits, motivational fulfilment and volunteer well-being associated with volunteers' perceived importance and achievement of conservation activities and outcomes?
2) How are volunteer managers' perception of volunteers' motivation and well-being associated with managers' ratings of actual importance and achievement of volunteers' conservation activities and outcomes?
3) How are actual volunteer motivation, motivational fulfilment and volunteer well-being associated with actual importance and achievement of volunteers' conservation activities and outcomes?

6.2 Methods

Data were obtained from three studies, Study 1) an onsite study of biodiversity monitoring and practical conservation volunteers (appendix IV, volunteer questionnaire; appendix V, volunteer

manager questionnaire), Study 2) an online survey of current volunteers (appendix VI for questionnaire), and Study 3) an online survey of current volunteer managers (appendix VII for questionnaire). The three research questions for this chapter were addressed using data from the three studies with results presented as outlined in Table 6.1.

Table 6.1. Overview of research questions, studies and elements in this chapter.

Research questions	Results section	Study 1 (onsite)	Study 2 (online, volunteers)	Study 3 (online, volunteer managers)
1) How are actual volunteer motivation, motivational benefits and fulfilment and volunteer well-being associated with volunteers' perceived importance and achievement of conservation activities and outcomes?	Section 3.1	Motivation + well-being + conservation (section 3.1.1)	Motivation + motivational benefits + MFI + well-being + conservation (section 3.1.2)	
2) How are volunteer managers' perception of volunteers' motivation and well-being associated with managers' ratings of actual importance and achievement of volunteers' conservation activities and outcomes?	Section 3.2			Motivation + well-being + conservation (section 3.2)
3) How are actual volunteer motivation, motivational fulfilment and volunteer well-being associated with actual importance and achievement of volunteers' conservation activities and outcomes?	Section 3.3	Motivation + well-being + conservation (section 3.3.1)	Motivation + MFI + well-being + conservation (section 3.3.2)	Conservation (section 3.3.2)

6.2.1 Procedure and participants

Study 1: The onsite study was conducted between October 2014 and September 2015 and involved volunteers and their managers in either biodiversity monitoring (BM, n=103) or practical conservation (PC, n=120) from ten organisations in Southern England. The survey was designed as a paired before-activity and after-activity survey to measure the change in volunteers' level of motivation and well-being as well as record their perceptions of conservation activity importance and achievement on the day (see details under sections 6.2.2.1, 6.2.2.4 and 6.2.2.6). Volunteer managers also rated actual importance and achievement of volunteers' conservation activities on the same days (see details under section

6.2.2.6). Volunteers only completed the paired set of questionnaires at one volunteer activity to ensure independent samples.

Study 2: Environmental organisations worldwide and volunteer centres in the UK were asked to invite their volunteers to participate and the survey was also sent out more widely through professional networks and social media such as email lists and LinkedIn groups. The online survey was open for three months between September and December 2015. Respondents selected a principal organisation for which they currently volunteered and answered questions with regard to that organisation in relation to their motivations, motivational benefits, volunteer-related well-being and perceived conservation activities and outcomes (see section 6.2.2 for details on measures). A total of 277 responses were received from current environmental volunteers with completed questions for at least one of the measures described below. Some respondents had skipped or missed questions, thereby lowering the sample sizes for some measures. Sample sizes are given in the results section. This total sample comprised 51% females and 49% males with an age range from 18 to 84 years old (mean=56.37, *SD*=14.82). Most respondents had at least one university degree (66%) and many were retired (53%) or in full-time (17%) or part-time (17%) employment. Respondents were from 7 different countries, with the majority residing in the United Kingdom (95%). Respondents named 85 different organisations they currently volunteer for. Respondents volunteered on average once a week, 33 hours per month and had been volunteering for an average of 11 years.

Study 3: The online volunteer manager survey was conducted in the same time frame and similarly to the survey in study 2. Respondents selected a principal organisation for which they currently manage volunteers and answered most questions with regard to that organisation in relation to the perceived motivations and well-being of their volunteers and actual conservation activities and outcomes (see section 6.2.2 for details on measures). A total of 85 responses were received from current environmental volunteer managers with completed questions for at least one of the measures described below. This total sample comprised 59% females and 41% males. Age ranged from 19 to 82 years old (mean=42.72, *SD*=14.68). Most respondents had at least one university degree (79%) and most were in full-time employment (67%) or retired (14%) or in part-time employment (12%). Respondents were from 10 different countries, with the majority residing in the United Kingdom (80%). Respondents named 49 different organisations they currently manage volunteers for. Respondents had managed volunteers for an average of 11.5 years.

6.2.2 Measures

6.2.2.1 Volunteer motivation

Study 1: Volunteers' level of motivation in the onsite study was measured twice in relation to the same volunteering activity: 1) before the volunteering activity started for volunteers' level of motivation for volunteering on that day (termed 'day-specific motivation') with one item, "Thinking about your volunteer activities today, how motivated are you about your volunteering today on a scale from 1 (not at all motivated) to 7 (extremely motivated)?" and 2) after the volunteer activity for volunteers' general motivation to volunteer with one item, "In general, how motivated are you about your volunteering on a scale from 1 (not at all motivated) to 7 (extremely motivated)?"

Study 2: The Volunteer Functions Inventory (VFI) (Clary et al. 1998) was adapted to reflect more recent research on motivations and environmental context (Ryan et al. 2001; Roggenbuck et al. 2001; Esmond and Dunlop 2004; Bruyere and Rappe 2007; Dolnicar and Randle 2007; Guiney and Oberhauser 2009; Wahl 2010; Raddick et al. 2010, 2013; Bramston et al. 2011; Asah and Blahna 2012; Chatters 2013b) and used to assess volunteer motivation (chapter 2, section 2.3.2.1 for details of adaptations). Through factor analysis, six factors were identified as important underlying reasons why people volunteer (chapter 3 for details of factor analysis). In summary, the first five factors identified with five of the original factors from the VFI: 1) 'values', to express or act on important personal beliefs, 2) 'understanding', to learn more about the world, other people and themselves, 3) 'social', to strengthen social relationships, 4) 'protective', to reduce negative feelings or to address personal problems, and 5) 'career', to gain career-related skills and experience (Clary et al. 1992). The final factor was identified as 6) 'recreation', to spend time outside and get exercise. All items were scored on a 7-point Likert scale (Likert 1932) ranging from 1 (not at all important or accurate) to 7 (extremely important or accurate). Motivational factor values were calculated by averaging the items belonging to the individual factors. The mean motivation score (MMS) was calculated as the average of all 34 motivational items on the questionnaire.

6.2.2.2 Volunteer motivational benefits

Volunteer motivational benefits were only measured in study 2, as questionnaires in study 1 needed to be kept short to ensure the highest possible participation. Respondents in study 2 reported their motivational benefits of volunteering using a 12-item measure adapted from previous research (Clary et al. 1998; Stukas et al. 2005, 2009) to correspond with the adapted VFI items (chapter 5 section 5.2.2.2 for details on the adapted motivational benefit items). In summary, five motivational benefit factors were identified, 'values', 'understanding', 'social',

'protective' and 'career', matching the five motivational factors similarly named. Items were rated on a 7-point Likert scale. The motivational benefit factor values were calculated by averaging the items belonging to the individual factors. The mean motivational benefit score (MMBS) was calculated as the average of all 12 motivational benefit items on the questionnaire.

6.2.2.3 Motivational Fulfilment Index (MFI)

The Motivational Fulfilment Index (MFI) was only possible to calculate from responses in study 2, where respondents had reported on their motivations and motivational benefits. To calculate the MFI, a 'match score' was calculated for each motivational factor, 'values', 'understanding', 'social', 'protective' and 'career', and multiplied by the motivation's ranking, and all resulting values were then summed to create the MFI. The match score was '1' if the motivational benefit factor value was equal to or greater than the motivational factor value, i.e. the motivation was fulfilled, otherwise it was scored as '0'. Motivational factors were based on the average motivational factor value, with the highest value having a rank of 5 and the lowest value a rank of 1 to reflect the differential importance of motivations. When there were ties, the rankings were split, i.e. if two values were the same and would have rankings 4 and 3, both were awarded 3.5. Subsequently the MFI was calculated as the match score for each factor multiplied by the rank of that factor (e.g. 'understanding' match score x 'understanding' factor rank) and summed across factors. With five possible matches and rankings from 5 to 1, the MFI ranges between 0 (no matches at all) to 15 (all five motivations fulfilled). This way of calculating the MFI recognises that all motivations are not equally important to volunteers and it allows a match of low importance motivations to have an, albeit small, positive effect, unlike previously suggested match indices by Clary et al. (1998) and Stukas et al. (2009).

6.2.2.4 Well-being

Well-being was investigated using a positive psychology approach based on the PERMA well-being theory proposed by Seligman (2011) and using the PERMA Profiler (PERMA-P) developed by Butler and Kern (2016). Through factor analysis (chapter 4 for details) five factors were identified to evaluate volunteer well-being. The five factors identified with five of the original seven factors from the PERMA-P: 1) 'engagement' (four items, α=0.79), employing one's strengths to a task, becoming fully absorbed in the task and therefore completely lose track of time, 2) 'relationships' (three items, α=0.77), feeling appreciated and supported, 3) 'meaning' (two items, α=0.88), the feeling of doing something worthwhile and having a purpose and direction in life, 4) 'negative emotions' (three items, α=0.64), feeling sad, frustrated or anxious, and 5) 'health' (three items, α=0.92), having good health and being satisfied with one's health. In addition to these factors, loneliness and happiness were each evaluated using a single item.

All items were scored on an 11-point (0-10) Likert scale (Likert 1932). Well-being factor values were calculated by averaging the items belonging to the individual factors. Overall mean well-being was calculated as the average of all 23 well-being-related items on the questionnaire including the 15 PERMA items as well as items for 'health', 'negative emotions' (reverse scored), 'loneliness' (reverse scored) and 'happiness'.

In study 1, volunteers' general well-being in life was measured before the volunteer activity and their activity-related well-being was measured just after the volunteer activity ended. In study 2, current volunteers completed questions regarding their remembered well-being during volunteering and former volunteers and potential future volunteers completed questions regarding their general well-being in life.

6.2.2.5 Satisfaction

Study 1: Similarly to motivation, satisfaction was measured twice in relation to the same volunteering activity: 1) Before the volunteer activity, satisfaction with life in general was measured by a single item, "How satisfied are you with your life at present?" A similar single item is widely used for measuring satisfaction with life (e.g. Office for National Statistics 2015; OECD 2016). 2) After the volunteer activity, satisfaction with the volunteer experience was measured by a single item, "How satisfied are you with your volunteering experience today?" A similar single item was used by Stukas et al. (2009).

Study 2: Satisfaction with the volunteer experience was measured by a single item, "Overall, how satisfied are you with your volunteer experiences?" In both studies, satisfaction was measured on an 11-point Likert scale from 0 (*not at all*) to 10 (*completely*).

6.2.2.6 Importance and goal achievement of volunteer conservation activities and outcomes

Volunteers were asked to list their activities (immediate, studies 1 and 2) and the outcomes (longer term, study 2) of their volunteering and rate how important they felt the activities and outcomes were ('perceived importance') and how well the goals set for their activities and outcomes were achieved ('perceived achievement'). Similarly, volunteer managers were asked to list their volunteers' activities and outcomes and rate how important these activities and outcomes were ('actual importance') and how well the goals set for the activities and outcomes were achieved ('actual achievement'). The importance and achievement of conservation activity and outcome goals were rated on a Likert scale from 1 (*not at all achieved*) to 7 (*completely achieved*).

Study 1: Session-specific conservation activities and activity goal importance were listed and rated by volunteers ('perceived importance') and their volunteer managers ('actual importance') before the volunteer activity. Goal achievement of those session-specific conservation activities were then rated by volunteers ('perceived achievement') and their volunteer managers ('actual achievement') after the volunteer activity. Ratings were averaged per individual for all listed conservation-related activities when more than one was listed.

Study 2: Volunteers were asked to list up to three conservation-related activities that they mostly performed during volunteering and rate their importance ('perceived importance') and how well those activities were achieved ('perceived achievement'). They were also asked to list up to three conservation-related outcomes of volunteering and rate their importance ('perceived importance') and how well those outcomes were achieved through volunteering ('perceived achievement'). Ratings were averaged per individual for all listed conservation-related activities and outcomes when more than one was listed.

Study 3: Similarly to the volunteers in study 2, volunteer managers in study 3 were asked to list up to three conservation-related activities that their volunteers mostly did and then assess the importance ('actual importance') and goal achievement ('actual achievement') of these activities. Volunteer managers were also asked to list up to three conservation outcomes of their volunteers' activities and assess their importance ('actual importance') and goal achievement ('actual achievement'). Ratings were averaged per individual for all listed conservation-related activities outcomes when more than one was listed.

Combining data from studies 2 and 3 to address research question 3: To assess the association between actual volunteer motivation and well-being and actual achievement of conservation activities and outcomes, volunteers from study 2 were matched with volunteer managers from study 3 based on their organisations and their volunteering type (biodiversity monitoring, practical conservation or biodiversity monitoring also doing practical conservation, Table 6.2). Where more than one volunteer manager from the same organisation managed volunteers in the same type of volunteering, the mean of their ratings were used (six incidences). Responses had been received from both volunteers and volunteer managers from 20 different organisations for conservation activities and 19 different organisations for conservation outcomes. Five of these organisations had matches in more than one type of volunteering, such as National Trust having matches in all three types of volunteering. Overall, there were a total of 26 organisation-type matches between volunteers and volunteer managers divided between biodiversity monitoring (n(volunteers)=28 (activities), 21

(outcomes), n(managers)=10), practical conservation (n(volunteers)=46 (activities and outcomes), n(managers)=9) and biodiversity monitoring also performing practical conservation (n(volunteers)=25 (activities), 22 (outcomes), n(managers)=8). All volunteers from one organisation-type were matched to the same volunteer manager or mean volunteer manager rating where there was more than one manager per organisation-type.

Table 6.2. Example of matching of volunteer managers from study 3 and volunteers from study 2 by organisation and volunteering type to assess conservation activities and outcomes. Total n for all variables given in last row.

Organisation	Type	Volunteer manager	Volunteer
Conservation organisation 1	BM	Volunteer manager 1	Volunteer 1 Volunteer 2 Volunteer 3
	PC	Mean rating of Volunteer manager 2 and Volunteer manager 3	Volunteer 4 Volunteer 5
Conservation organisation 2	PC	Volunteer manager 4	Volunteer 6 Volunteer 7
…			
20 organisations	3 types, 26 organisation-types	20 individual managers, 6 means for multiple managers	99 volunteers (activities), 89 volunteers (outcomes)

Note: BM: biodiversity monitoring. PC: practical conservation.

6.2.3 Data analysis

All motivation, motivational benefit and well-being variables had skewed distributions and as they were measured on Likert scales, they also had bounded distributions, 1-7 for motivation and 0-10 for well-being variables, and errors were non-normal. One approach to dealing with this type of data is through the use of generalised linear models (GLMs)with binomial errors (Crawley 2007). Thus all variables were transformed to proportional data by dividing values by the highest possible variable value, creating distributions between 0 and 1. Correlation analysis was performed on the transformed data. Hierarchical generalised linear regression was performed to assess if fulfilment of volunteer motivations (through the MFI), volunteer overall well-being or well-being elements, or the importance of the activities or outcomes added to the prediction of activity or outcome goal achievement over and above volunteer motivation. Sample size should be at least 50 + 8 x the number of independent variables to test the overall regression, and to test the individual predictors it should be at least 104 + number of independent variables (Tabachnick and Fidell 1996). To comply with this sample size requirement, it was necessary to use mean motivational score and overall well-being score

rather than motivational factors and well-being elements for data analysis involving volunteer manager data (research question 2) and matched volunteer-volunteer manager data (research question 3). All statistical analyses were completed using RStudio v.3.2.3 (RStudio Team 2015).

6.3 Results

6.3.1 How are volunteers' motivations, motivational benefit and fulfilment and well-being associated with their perception of conservation activity importance and goal achievement?

6.3.1.1 How are volunteers' motivation and well-being associated with their perception of conservation activity importance and goal achievement (study 1)?

There were no significant differences between biodiversity monitoring (n=90-103) and practical conservation (n=105-120) volunteers' ratings of day-specific (mean=6.13, *SD*=0.93; U=6437, p>0.56) or general level of motivation (mean=6.22, *SD*=0.82; U=5381, p>0.70), or their perceived importance (mean=6.15, *SD*=0.93; U=6093, p>0.26) or achievement (mean=6.09, *SD*=0.91; U=5300, p>0.11) of conservation activity goals, or their well-being (chapter 4), so the two types of volunteers were combined for further analyses.

Volunteers' perceived importance and achievement of the conservation activities on the day were significantly and positively correlated with levels of day-specific and general volunteer motivation as well as with all positive well-being indices (r ranged from 0.17 to 0.60, $p<0.05$), except for perceived achievement and health (Table 6.3). However, volunteers' negative indices of well-being were not significantly correlated with their perceived importance and achievement of conservation activities. Volunteers believing the conservation activities were important also perceived that the conservation goals were achieved ($r=0.39$, $p<0.001$).

Table 6.3. Correlations between level of volunteer motivation, elements of volunteer well-being and conservation activities as perceived by the volunteers (study 1).

	Conservation activities	
Variables	**Perceived importance**	**Perceived goal achievement**
Volunteer motivation		
Day-specific motivation	0.41***	0.25***
General motivation	0.44***	0.47***
Elements of volunteer well-being		
Engagement	0.37***	0.38***
Relationship	0.32***	0.33***
Meaning	0.54***	0.60***
Health	0.17*	0.12
Negative	-0.02	-0.11
Loneliness	0.03	0.01
Happy	0.40***	0.32***
Overall well-being	0.40***	0.44***
Satisfaction	0.40***	0.54***
Conservation activities		
Perceived importance		0.39***

Note: n= 180-213 due to some missing values.
* p<0.05, *** p<0.001.

Hierarchical regression showed that volunteers' perceived achievement of conservation activity goals increased significantly with day-specific level of motivation (B=2.50, p<0.001, Table 6.4). Adding the seven elements of volunteering-related well-being to the model significantly improved the model though this could be attributed to only one significant independent variable, 'meaning' (B=4.86, p<0.001). Adding volunteers' perceived importance of conservation activities to the model did not significantly improve it. Overall, level of day-specific volunteer motivation, well-being and perceived importance of activities predicted 28% of perceived conservation activity goal achievement.

Table 6.4. Hierarchical regression showing volunteers' perceived conservation goal achievement regressed on level of volunteer day-specific motivation (step 1), volunteering-related elements of well-being (step 2) and volunteers' perceived importance of conservation activities (step 3) (study 1).

Variable	Volunteers' perception of conservation activity goal achievement
n	178
Step 1	
Day-specific motivation	2.50***
R^2	0.07
Step 2	
Engagement	-0.30
Relationship	1.11
Meaning	4.86***
Health	-1.26
Negative emotions	-0.72
Loneliness	1.53
Happy	0.52
R^2	0.27
R^2 change	0.20***
Step 3	
Perceived importance	1.48
R^2	0.28
R^2 change	0.01

*** p<0.001.

6.3.1.2 How are volunteers' motivations, motivational benefit and fulfilment and well-being associated with their perception of conservation activity importance and goal achievement (study 2)?

There were no significant differences between the three types of environmental volunteers' ratings of perceived importance (mean=6.37, *SD*=0.73; $\chi^2(2)=2.01$, p>0.36) or achievement (mean=5.72, *SD*=0.96; $\chi^2(2)=0.81$, p>0.66) of conservation activities or perceived importance (mean=6.52, *SD*=0.64; $\chi^2(2)=0.69$, p>0.70) or achievement (mean=5.56, *SD*=1.04; $\chi^2(2)=3.45$, p>0.18) of conservation outcomes.

'Values' and 'understanding' motivations as well as mean volunteer motivation were significantly positively correlated with volunteers' perceived importance and goal achievement

of both conservation activities and outcomes (r ranged from 0.20 to 0.38, p<0.01, Table 6.5). The 'social' motivation factor was significantly positively correlated with perceived achievement of both activities and outcomes (r ranged from 0.14 to 0.16, p<0.05) and the 'recreation' factor was positively correlated with perceived importance of conservation activities (r=0.16, p<0.05). Similarly to motivation, the 'values', 'understanding' and 'social' motivational benefits were significantly positively correlated with both importance and achievement of both activities and outcomes (r ranged from 0.15 to 0.30, p<0.05), except for 'values' and outcome achievement, and 'social' and outcome importance (p>0.14). Mean Motivational Benefit Score was significantly positively correlated with activity importance and achievement (r ranged from 0.16 and 0.20, p<0.05), though not with outcome variables (r=0.12). The Motivational Fulfilment Index (MFI) was not significantly correlated with perceived importance or achievement of either conservation activities or outcomes. Similarly to motivation, the positive elements of volunteer well-being, i.e. 'relationship', 'meaning' and 'happiness' elements as well as overall volunteer well-being, were significantly positively correlated with all aspects of conservation activities and outcomes (r ranged from 0.15 to 0.38, p<0.05). 'Engagement' (r ranged from 0.26 to 0.29, p<0.001) and 'health' (r ranged from 0.18 to 0.20, p<0.001) were also significantly positively correlated with all, except perceived importance of conservation outcomes and perceived achievement of conservation activities, respectively. Of the negative indices of well-being, 'negative emotions' were significantly negatively correlated with perceived goal achievement of both activities and outcomes (r ranged from -0.21 to -0.17, p<0.05) but 'loneliness' was not significantly correlated with any aspect of conservation activities or outcomes. All aspects of conservation activities and outcomes were significantly positively correlated with each other (r ranged from 0.22 to 0.66, p<0.001).

Table 6.5. Correlations between volunteer motivation and well-being and the perceived achievement of conservation activities and outcomes by volunteers (study 2).

Variables	**Conservation activities**		**Conservation outcomes**	
	Perceived importance	Perceived achievement	Perceived importance	Perceived achievement
n	211-235	210-235	202-213	201-213
Volunteer motivation				
Values	0.32***	0.30***	0.38***	0.20**
Understanding	0.27***	0.24***	0.20**	0.26***
Recreation	0.16*	0.00	0.06	0.00
Social	0.10	0.16*	0.02	0.14*
Protective	0.08	0.08	-0.01	0.06
Career	0.07	0.10	0.08	0.09
MMS	0.29***	0.25***	0.23**	0.22**

Variables	Conservation activities		Conservation outcomes	
	Perceived importance	Perceived achievement	Perceived importance	Perceived achievement
Volunteer motivational benefits				
Values	0.15*	0.21**	0.17*	0.10
Understanding	0.29***	0.16*	0.30***	0.15*
Social	0.20**	0.23***	0.10	0.20**
Protective	0.01	0.08	-0.04	-0.01
Career	0.07	0.09	0.06	0.09
MMBS	0.16*	0.20**	0.12	0.12
MFI	0.06	0.02	0.08	-0.09
Elements of volunteer well-being				
Engagement	0.26***	0.28***	0.13	0.29***
Relationship	0.21**	0.30***	0.15*	0.36***
Meaning	0.38***	0.33***	0.35***	0.31***
Health	0.18***	0.13'	0.20***	0.18***
Negative	-0.05	-0.17*	-0.04	-0.21**
Loneliness	-0.08	-0.02	-0.07	-0.07
Happy	0.19**	0.26***	0.16*	0.30***
Overall well-being	0.28***	0.35***	0.23**	0.35***
Satisfaction	0.22***	0.30***	0.17*	0.31***
Conservation activities				
Perceived achievement	0.26***			
Conservation outcomes				
Perceived importance	0.60***	0.30***		
Perceived achievement	0.25***	0.66***	0.22***	

Note: MMS: Mean Motivational Score. MMBS: Mean Motivational Benefit Score. MFI: Motivational Fulfilment Index. n= 201-235 due to some missing values. ' p<0.06, * p<0.05, ** p<0.01, *** p<0.001.

Hierarchical regression showed that the motivational 'values' (B=1.55, p<0.001, Table 6.6) and 'social' (B=0.80, p<0.05) factors positively influenced, and the 'recreation' (B=-0.96, p<0.05) motivational factor negatively influenced volunteers' perceived activity goal achievement, whereas only the 'understanding' motivation positively influenced perceived outcome goal achievement (B=1.27, p<0.01). Adding the Motivational Fulfilment Index (MFI) did not add to either model in step two (p>0.05). The well-being elements did add significantly to both models, though only 'negative emotions' was a significant negative element of the activity goal achievement model (B=-1.12, p<0.05) and 'loneliness' was marginally positively significant in the outcome goal achievement model (B=0.92, p<0.06). Finally, adding volunteers' perceived importance of the conservation activity (B=1.44) or outcome (B=1.78) significantly improved perceived goal achievement in both models (p<0.05). Overall, the four elements, motivation, MFI, well-being and activity importance, predicted 22% and 23% of the models for perceived conservation goal achievement of activities and outcomes, respectively.

Table 6.6. Hierarchical regression showing volunteers' perceived conservation goal achievement for conservation activities and outcomes regressed on volunteers' mean motivation (step 1), Motivational Fulfilment Index (MFI) (step 2), volunteering-related well-being (step 3) and volunteers' perceived importance of the conservation activity or outcome (step 4) (study 2).

		Conservation goal achievement	
	Variable	**Activity goals**	**Outcome goals**
	n	212	191
Step 1			
	Values	1.55***	0.80
	Understanding	0.72	1.27**
	Recreation	-0.96*	-0.73
	Social	0.80*	0.57
	Protective	-0.26	-0.44
	Career	-0.04	-0.05
	R^2	0.12	0.09
Step 2			
	MFI	0.20	-0.23
	R^2	0.12	0.10
	R^2 change	0.00	0.01
Step 3			
	Engagement	1.11	1.31
	Relationship	0.34	1.27
	Meaning	0.82	0.14
	Health	-0.38	-0.03
	Negative emotions	-1.12*	-0.93
	Loneliness	0.70	0.92'
	Happy	0.41	0.41
	R^2	0.20	0.21
	R^2 change	0.08**	0.11***
Step 4			
	Perceived importance	1.44*	1.78*
	R^2	0.22	0.23
	R^2 change	0.02*	0.02*

' p<0.06, * p<0.05, ** p<0.01, *** p<0.001.

6.3.2 How are volunteer managers' perception of volunteers' motivation and well-being associated with actual importance and achievement of conservation activities and outcomes (study 3)?

There were no significant differences between the three types of environmental volunteer managers' ratings of actual importance (mean=6.28, *SD*=0.81; $\chi^2(2)=1.29$, p>0.52) or achievement (mean=5.51, *SD*=1.10; $\chi^2(2)=0.71$, p>0.70) of conservation activities or actual importance (mean=6.58, *SD*=0.60; $\chi^2(2)=0.14$, p>0.93) or achievement (mean=5.33, *SD*=1.22; $\chi^2(2)=0.18$, p>0.91) of conservation outcomes.

Volunteer managers' perception of volunteer motivational factors as well as the mean motivational score were significantly positively correlated with actual conservation activity and outcome achievement (r ranged from 0.27 to 0.42, $p<0.05$, Table 6.7), except for 'career' motives for both and 'values' motivation for outcomes. The managers' perceived positive elements of volunteer well-being, 'engagement', 'relationship' and 'meaning' as well as overall well-being, were also positively correlated with actual activity and outcome achievement (r ranged from 0.29 to 0.50, $p<0.05$). Negative well-being indices were not correlated with any aspects of conservation activities or outcomes. Conservation activity and outcome importance and goal achievement were all significantly positively correlated (r ranged from 0.25 to 0.71, $p<0.05$), except for activity importance and outcome goal achievement.

Table 6.7. Correlations between volunteer managers' perception of their volunteers' motivations and elements of well-being and their rating of actual goal importance and achievement of conservation activities and outcomes (study 3).

Variables	**Conservation activities**		**Conservation outcomes**	
	Actual importance	Actual goal achievement	Actual importance	Actual goal achievement
Volunteer motivation				
Values	0.25*	0.28*	0.30*	0.16
Recreation	0.19	0.34***	0.39***	0.31**
Social	0.19	0.23'	0.16	0.42***
Protective	0.10	0.40***	0.28*	0.39***
Career	0.08	0.15	0.27*	0.22
MMS	0.25*	0.33**	0.34**	0.40***
Elements of volunteer well-being				
Engagement	0.22	0.39***	0.33**	0.50***
Relationship	0.15	0.33**	0.26*	0.39***
Meaning	0.23'	0.30*	0.36**	0.29*
Health	0.19	0.28*	0.28*	0.20
Negative	0.00	-0.15	-0.08	0.02
Loneliness	-0.02	-0.02	-0.04	0.09
Happy	0.07	0.26*	0.24'	0.24'
Overall well-being	0.21	0.39***	0.32**	0.35**

Variables	Conservation activities		Conservation outcomes	
	Actual importance	Actual goal achievement	Actual importance	Actual goal achievement
Satisfaction	0.17	0.24*	0.22'	0.32**
Conservation activities				
Actual goal achievement	0.25*			
Conservation outcomes				
Actual importance	0.52***	0.37**		
Actual goal achievement	0.22	0.71***	0.29*	

Note: n= 69-82 due to some missing values.
* p<0.05, ** p<0.01, *** p<0.001.

Hierarchical regression showed volunteer managers' mean score for their perception of volunteers' motivation was a significant predictor of conservation goal achievement for both activities and outcomes in step 1 (Table 6.7). Adding managers' overall score for their perception of volunteers' well-being in step two was significant for activity goal achievement, but not for outcome goal achievement. The last step of adding the importance of the conservation activity or outcome did not significantly improve either model. Overall, mean perceived motivational score, perceived well-being and actual activity importance predicted 16% of the activity goal achievement, and mean perceived motivational score, perceived well-being and outcome importance predicted 19% of conservation outcome goal achievement.

Table 6.8. Hierarchical regression showing actual conservation goal achievement for activities and outcomes regressed on perceived mean motivation of volunteers (step 1), perceived volunteer well-being (step 2) and the actual importance of the conservation activity or outcome (step 3) (study 3).

		Conservation goal achievement	
	Variable	**Activity goals**	**Outcome goals**
	n	70	69
Step 1			
	Mean perceived volunteer motivational score	2.46*	3.94**
	R^2	0.06	0.14
Step 2			
	Overall perceived volunteer well-being	3.17*	2.32
	R^2	0.14	0.18
	R^2 change	0.08*	0.04
Step 3			
	Actual importance of activity or outcome	1.28	1.40
	R^2	0.16	0.19
	R^2 change	0.02	0.01

* p<0.05, ** p<0.01, *** p<0.001.

6.3.3 How are actual volunteer motivation, motivational fulfilment and well-being associated with actual importance and achievement of volunteers' conservation activities and outcomes?

6.3.3.1 How are actual volunteer motivation and well-being associated with actual importance and achievement of volunteers' conservation activities and outcomes (study 1)?

Volunteer managers' rating of actual importance of conservation activities was not correlated with volunteers' perceived importance of conservation activity goals or their actual volunteer motivation or well-being, but it was positively correlated with volunteers' perceived achievement of conservation activity goals (r=0.16, p<0.05, Table 6.9). Volunteer managers' rating of actual achievement of conservation activity goals was negatively correlated with day-specific volunteer motivation (r=-0.16, p<0.05) and positively correlated with volunteers' self-reported health (r=0.16, p<0.05). Volunteer managers ratings of actual importance and achievement of conservation activity goals were significantly positively correlated (r=0.22, p<0.001).

Table 6.9. Correlations between level of volunteer motivation, elements of volunteer well-being and conservation activity importance and goal achievement rated by volunteer managers (study 1).

	Conservation activities	
Variables	Actual importance	Actual achievement
Volunteer motivation		
Day-specific motivation	-0.12	-0.16*
General motivation	-0.01	-0.05
Elements of volunteer well-being		
Engagement	-0.08	-0.06
Relationship	0.06	0.02
Meaning	0.11	0.04
Health	0.04	0.16*
Negative	0.00	-0.08
Loneliness	-0.02	0.11
Happy	0.01	0.01
Overall well-being	0.05	0.05
Satisfaction	0.10	0.07
Conservation activities		
Perceived importance (volunteers)	0.01	0.00
Perceived achievement (volunteers)	0.16*	0.13
Actual importance (volunteer managers)		0.22***

Note: n= 193-223 due to some missing values.
* p<0.05, *** p<0.001.

Predicting actual conservation goal achievement relied solely on the actual importance of the volunteer activities as rated by the volunteer managers (B=2.64, p<0.001, step 3 in the hierarchical regression, Table 6.10), though loneliness was marginally significant in the second step of the analysis (B=1.33, p<0.06).

Table 6.10. Hierarchical regression showing volunteer managers' actual conservation activity goal achievement regressed on level of volunteer day-specific motivation (step 1), volunteering-related elements of well-being (step 2) and volunteer managers' rating of actual conservation activity importance (step 3) (study 1).

	Variable	Actual conservation activity goal achievement
	n	193
Step 1		
	Day-specific motivation	-1.36
	R^2	0.02
Step 2		
	Engagement	-1.66
	Relationship	-0.77
	Meaning	0.58
	Health	0.79
	Negative emotions	-1.00
	Loneliness	1.33'
	Happy	1.48
	R^2	0.07
	R^2 change	0.05
Step 3		
	Actual conservation activity importance	2.64***
	R^2	0.13
	R^2 change	0.06***

' p<0.06, *** p<0.001

6.3.3.2 How are actual volunteer motivations, motivational fulfilment and well-being associated with actual importance and achievement of volunteers' conservation activities and outcomes (studies 2 and 3)?

For this smaller sample size, due to the matching process of volunteers to volunteer managers by organisation and volunteering type described in section 6.2.3, there was a significant difference in volunteer managers' ratings of conservation activity and outcome goal achievement between volunteering types. For conservation activity achievement ($\chi^2(2)=6.23$, $p<0.05$), managers in practical conservation rated activity achievement significantly higher than biodiversity monitoring managers also performing practical conservation ($p<0.05$) and marginally higher than biodiversity monitoring managers ($p<0.06$). For conservation outcomes ($\chi^2(2)=5.97$, $p=0.05$), the pattern was similar as managers in practical conservation rated outcome achievement significantly higher than biodiversity monitoring managers also

performing practical conservation ($p<0.05$). However, due to the small sample size of volunteer managers, data from all volunteering types were grouped together for analysis.

The organisation-based mean goal achievement for both conservation activities and outcomes were significantly positively correlated with the 'social' motivation factor (r ranged from 0.21 to 0.22, $p<0.05$; Table 6.11) and goal achievement for activities was significantly negatively correlated with the 'values' motivation ($r=-0.19$, $p<0.05$). The MFI was not significantly correlated with any aspects of organisation-based conservation activity or outcome. Organisation-based mean importance of conservation outcomes was significantly negatively correlated with the 'engagement' well-being element ($r=-0.29$, $p<0.01$) and volunteer satisfaction ($r=-0.20$, $p<0.05$) but the organisation-based mean importance of conservation activities was not significantly correlated with any volunteer-rated variables ($p>0.07$). No conservation activity or outcome perceived importance or achievement was correlated with any volunteer manager-rated conservation variables. Similarly to the full volunteer manager sample, actual importance and achievement of activities and outcomes were all significantly correlated (r ranged from 0.34 to 0.90, $p<0.001$), except for activity importance and outcome achievement ($p>0.81$).

Table 6.11. Correlations between volunteer motivation, Motivational Fulfilment Index (MFI) and volunteer well-being and the organisation-based mean actual importance and goal achievement of conservation activities and outcomes (studies 2 and 3).

Variables	Conservation activities		Conservation outcomes	
	Actual importance	Actual achievement	Actual importance	Actual achievement
Volunteer motivation				
Values	0.07	-0.19*	-0.08	-0.14
Understanding	-0.09	-0.09	-0.13	-0.03
Recreation	0.12	0.09	-0.06	0.14
Social	0.01	0.21*	0.07	0.22*
Protective	0.11	0.04	-0.05	0.09
Career	-0.04	0.00	-0.12	0.04
Mean Motivational Score	0.01	-0.03	-0.12	0.03
MFI	0.10	-0.01	-0.06	-0.01
Elements of volunteer well-being				
Engagement	0.02	-0.16	-0.29**	-0.14
Relationship	0.02	0.00	-0.04	-0.07
Meaning	0.00	-0.11	-0.08	-0.14
Health	-0.06	0.02	-0.12	0.02
Negative	0.10	0.03	0.04	0.09
Loneliness	0.13	-0.02	0.03	0.05
Happy	0.02	-0.04	-0.13	-0.08
Overall well-being	-0.02	-0.06	-0.16	-0.09
Satisfaction	-0.09	-0.12	-0.20*	-0.17
Conservation activities				
Perceived importance (volunteers)	0.08	-0.09	-0.06	-0.01
Perceived achievement (volunteers)	-0.09	-0.18	-0.10	-0.16
Actual importance		0.11	0.43***	0.02
Actual achievement			0.47***	0.90***
Conservation outcomes				
Perceived importance (volunteers)	0.03	0.03	0.01	0.02
Perceived achievement (volunteers)	-0.12	-0.15	-0.17	-0.17
Actual importance				0.34***

Note: MMS: Mean Motivational Score. n= 88-114 due to some missing values.
* p<0.05, ** p<0.01, *** p<0.001.

The hierarchical regression showed that volunteers' Mean Motivational Score, MFI and overall well-being were not significant predictors of organisation-based mean conservation activity or outcome achievement (Table 6.12).

Table 6.12. Hierarchical regression showing organisation-based mean actual goal achievement of conservation activities and outcomes regressed on volunteers' mean motivation (step 1), Motivational Fulfilment Index (MFI) (step 2), volunteering-related well-being (step 3) (studies 2 and 3).

	Conservation goal achievement	
Variable	**Activities**	**Outcomes**
N	105	101
Step 1		
Mean Motivational Score	-0.15	0.16
R^2	0.00	0.00
Step 2		
MFI	-0.10	-0.06
R^2	0.00	0.00
R^2 change	0.00	0.00
Step 3		
Overall volunteer well-being	-0.37	-0.82
R^2	0.00	0.01
R^2 change	0.00	0.01

6.4 Discussion

The aim of this chapter was to investigate the perceived and actual importance of volunteer motivation, motivational fulfilment and well-being for achieving conservation activity and outcome goals as experienced and perceived by volunteers and volunteer managers. The results showed that volunteers who were more motivated and had higher levels of positive well-being indices, such as 'engagement', 'relationship', 'meaning' and 'happiness', and had fewer negative emotions, perceived they achieved more of their conservation activity and outcome goals. Similarly, volunteer managers perceiving their volunteers had higher levels of motivation and positive well-being indices also indicated that the volunteers achieved more conservation activity and outcome goals. By contrast, though associations were found between some motivational and well-being factors and conservation achievement, volunteers' actual motivation and well-being did not predict how well actual conservation activity and outcome goals were achieved, highlighting a discrepancy between perception and reality. The discussion sections below will further explore these points.

6.4.1 How actual volunteer motivation, motivational benefits and fulfilment and volunteer well-being are associated with volunteers' perceived importance and achievement of conservation activity and outcome goals

Results showed that more motivated volunteers reporting higher rates of motivational benefits and higher levels of satisfaction and positive indices of well-being, such as 'engagement', 'relationship', 'meaning' and 'happiness', also believed they achieved more of their conservation goals. Generally, people with positive attitudes have been found to construe situations and events in ways that enhance their happiness and positive outlook (Lyubomirsky 2001), which may explain these results. Also, previous qualitative research found that practical conservation work provided volunteers with very tangible outputs from their activities, for example clearing an area of invasive species, and volunteers enjoyed seeing these immediate benefits of their work (O'Brien et al. 2010; Weng 2015). These very visible outputs could lead volunteers to conclude that activity goals had been reached, particularly if no specific goals had been outlined by volunteer managers at the start of the volunteer activity. Only two identified studies have investigated volunteers' perception of their activity achievement, both investigating volunteers in a social context, and they found that over 90% of volunteers believed their volunteering benefitted the community or the people they served (Morrow-Howell et al. 2009; Connolly and O'Shea 2015). Contrary to this positive interaction between attitude, outlook and goal achievement, volunteers with high levels of 'negative emotions' perceived they achieved less of their conservation activity and outcome goals. This association has previously been observed as negative affect was found to correlate strongly with lower perceived probability of success (Emmons 1986).Thus it would seem that humans' underlying propensity for associating positive attitudes with success and negative attitudes with failure also applies to volunteers' perception of their ability to achieve conservation goals.

Although this is the first study to investigate the possible causality between volunteers' motivation and well-being and their perception of conservation goal achievement, and has demonstrated that high levels of volunteer motivation and well-being are correlated with high levels of perceived achievement, correlation does not prove causality. As day-specific motivation was measured before volunteering and perceived conservation goal achievement was measured after volunteering ended hours later, it can be argued that the measured level of motivation before volunteering may have influenced the perceived conservation achievement, and motivation was indeed found important in predicting perceived conservation goal achievement along with the well-being element of 'meaning'. However, as well-being and perceived conservation goal achievement were both measured after volunteering, causality cannot firmly be established between well-being and perceived

conservation goal achievement. In addition, this may be an association similar to the 'virtuous cycle' (Brooks 2007, p. 409) of happy people volunteering more and volunteers being happier people. Similarly, people finding their volunteering more meaningful may also perceive they achieve more conservation goals and volunteers perceiving to achieve their conservation goals may also find their volunteering more meaningful. When volunteers reflected on their volunteer motivations, motivational benefits and well-being later on, the 'value' motivation was the most important predictor of perceived conservation activity goal achievement but the 'meaning' well-being element was found to be unimportant. This may be due to the potential overlap in variance between the two as volunteers with strong 'values' motives may also experience their volunteer activity as more meaningful. Perceived conservation outcome goal achievement was primarily predicted by 'understanding' motives, suggesting that volunteers with a desire for learning perceive the 'bigger picture' of their conservation volunteering and believe that volunteering is important in achieving the longer-term conservation outcomes, even if the short-term activity goals may not be perceived as very important individually. Again, 'negative emotions' were important in predicting lower perceived achievement of conservation goals.

6.4.2 How volunteer managers' perception of volunteers' motivation and well-being are associated with managers' ratings of actual importance and achievement of volunteers' conservation activities and outcomes

This is the first study to investigate the relationship between volunteer managers' perceptions of volunteer motivation and well-being, and actual conservation goal achievement. It highlights the shared understanding that volunteers and managers have about a positive relationship between volunteers' motivations and well-being and the conservation goal achievements of volunteer activities and outcomes. Similarly to the volunteers, the volunteer managers believed that more motivated volunteers with higher levels of satisfaction and positive well-being elements, such as 'engagement', 'relationship', 'meaning' and 'happiness', achieved more conservation activity and outcome goals. This suggests that volunteer managers recognised the positive attitude, outlook and goal achievement interaction (Lyubomirsky 2001), though they did not perceive a negative interaction between 'negative emotions' and less success (Emmons 1986) in the volunteers. Managers also perceived a link between how important an activity or outcome was and the achievement of it, suggesting that either they or their volunteers exert more effort in achieving what managers believe are important conservation goals. However, the actual importance of the activity and outcome goals did not add to the prediction of goal achievement over and above perceived volunteer

motivation and well-being, suggesting that volunteer managers perceive that volunteers are driving the conservation goal achievement through their motivation and well-being, rather than the importance of the activity or outcome driving the achievement of conservation goals.

6.4.3 How actual volunteer motivation, motivational fulfilment and volunteer well-being are associated with actual importance and achievement of volunteers' conservation activities and outcomes

Results showed that there was no similarity in conservation goal achievement ratings between volunteers and volunteer managers. One reason for this 'missing link' may be that, for example, practical conservation volunteers involved in habitat restoration may not experience and appreciate the whole impact-creation process of habitat restoration. This is a process which takes many years and requires many different actions, and volunteers may not participate in all necessary actions if they are only involved for a shorter period of time (Weng 2015). In contrast, many volunteer managers are involved over the longer term and focus not only on the activities on one day but on the whole project process (Weng 2015), thereby having a somewhat different view on achievement of conservation goals than volunteers have. This discrepancy in perception of conservation goal achievement could therefore stem from a time-lag problem, described as a discrepancy due to the different timescales that measures are evaluated on (Wright and Staw 1999). Practical conservation volunteers enjoy seeing the often very tangible and immediate outputs of their activities, for example clearing an area of invasive species (O'Brien et al. 2010; Weng 2015), which was also emphasised by one of the volunteers:

> "If the volunteers do something physical then there must be some impact, whether it ticks a specific conservation-goal box may be less important that the fact that change is seen to have taken place by the volunteers."
>
> (Volunteer)

However, in some cases volunteers may unintentionally prolong the restoration process through their activities, for example through uprooting whole plants thereby causing soil disturbance and the spread of seeds of invasive plants (Weng 2015) or through affecting the boom and bust cycle of invasive species (Gray and Jones 1977), leading volunteer managers to rate conservation achievement differently to the volunteers. This research aimed to mitigate this difference in focus by investigating activity (immediate) and outcome (longer-term) goal achievement with separate questions, thereby focusing the respondents' attention to the

specified timescale. As results still showed a discrepancy between volunteers' and volunteer managers' conservation goal achievement ratings, this suggests there may be other factors involved in their ratings, providing an interesting avenue for future research.

A surprising result from this study is that volunteers who were more motivated before their volunteer activity started actually achieved less by the end of their volunteer activity according to their volunteer managers. However, the onsite study did not assess the type of motivation the volunteers had, so one possible explanation for the result could be that they were motivated more by for example 'social' or 'recreation' factors than the 'values' factor to actually achieve a conservation goal. Dwyer et al. (2013) for example did indeed find that social motives were negative predictors of volunteer contributions measured as volunteer hours and number of projects volunteers were involved in. However, results from the online surveys contradict this, as those volunteers who were more motivated by 'social' motives, also achieved more in terms of conservation goals. One possible reason for this may be that socially-motivated volunteers may feel guilty about volunteering more for social reasons than to support a cause and may therefore put more effort into the work they perform. Volunteers within participatory monitoring networks were found to place a high degree of significance on their social experience and successful creation and management of these networks thus require that similar levels of attention be paid to social aspects of the organisation as are paid to the generation and management of data (Bell et al. 2008). Contrary to socially-motivated volunteers, value-motivated volunteers may believe they already make a contribution simply by turning up, and therefore they put less effort into the work they perform and take more time to enjoy other aspects of the volunteer experience, leading to 'value' motivation being negatively associated with conservation goal achievement in the present research. Further research is needed to evaluate the effort differently motivated volunteers put into their volunteering and establish if the above suggestions are valid.

Positively associated with achievement of conservation activity goals was volunteers' sense of health immediately after volunteering, which could be expected as healthier volunteers would be able to perform the sometimes difficult and physically demanding tasks involved in environmental volunteering. This is also supported by previous research which suggested that performance, i.e. conservation achievement in the context of this research, is a function of both motivation and ability (Lewin 1935 cited by Millette and Gagné 2008), where ability in this case would be volunteer health. Apart from health, no other well-being factors were associated with actual conservation achievement, though that might have been expected as a comprehensive meta-analysis by Lyubomirsky et al. (2005) suggested that positive affect has a

positive influence on many aspects in life including positive supervisory evaluations, community involvement and social relationships.

Overall, actual volunteer motivation and well-being did not predict actual achievement of conservation goals in this research, which was contrary to both volunteers' and volunteer managers' perceptions of this relationship. This finding could be explained by volunteer managers praising their volunteers for the work they performed, thereby increasing their well-being and keeping them motivated (Jacobsen et al. 2012), even though the conservation goal may not have been achieved, as also suggested by a comment from a volunteer manager:

> "I think that we often convince volunteers we have achieved what we set out to achieve, even if it is not strictly true!"
>
> (Volunteer manager)

Another possible explanation is that volunteers and volunteer managers from the online studies, even though from the same organisations and matched based on type of environmental volunteering, were evaluating very different projects within the organisations. However, the same results were found for the onsite study where volunteers and volunteer managers were together on the same day, evaluating the same environmental volunteer activity, thus suggesting that the finding is valid across environmental volunteering and is not merely an artefact of the survey design.

6.4.4 Implications for conservation management

Ensuring successful outcomes of environmental volunteering appears to be a fine balance between ensuring continued volunteer engagement through fulfilling volunteer motivations and enhancing volunteer well-being on one hand and achieving actual conservation outcomes on the other, seemingly with no direct link between the two. This does not imply that volunteer managers can disregard the motivations and well-being of their volunteers and solely focus on the conservation outcomes; rather, due to the indirect links it implies that managers who do consider and fulfil their volunteers' motivations, especially the social motives, and enhance the well-being of their volunteers, ultimately will achieve better conservation outcomes than managers who do not consider and fulfil their volunteers' motivations and enhance their well-being.

6.5 Conclusion

This chapter has shown that both volunteers and volunteer managers believe that more motivated volunteers with higher levels of well-being would achieve more conservation goals. Surprisingly however, this research has also shown that no such direct link from volunteer motivation and well-being to conservation achievement exists in reality. The results highlight a discrepancy between perception and reality of conservation achievement, which could be caused by volunteer managers always providing positive feedback to volunteers on conservation achievement to ensure continued engagement from the volunteers, even if conservation goals were not actually achieved. Further research is required to establish if this is the case and what effect this practice may have on conservation outcomes as well as volunteer engagement. This study highlighted how conservation achievement is not a direct outcome of volunteer motivation and well-being, but rather is linked indirectly through ongoing volunteer engagement, which relies on volunteers' motivation and well-being.

Chapter 7 Thesis discussion

7.1 Overview

The aim of this thesis was to investigate the relationships between environmental volunteer motivation, volunteer well-being and conservation achievement as perceived and experienced by volunteers and volunteer managers. It examined a proposed model for environmental volunteering through the three stages of volunteering (Figure 7.1).

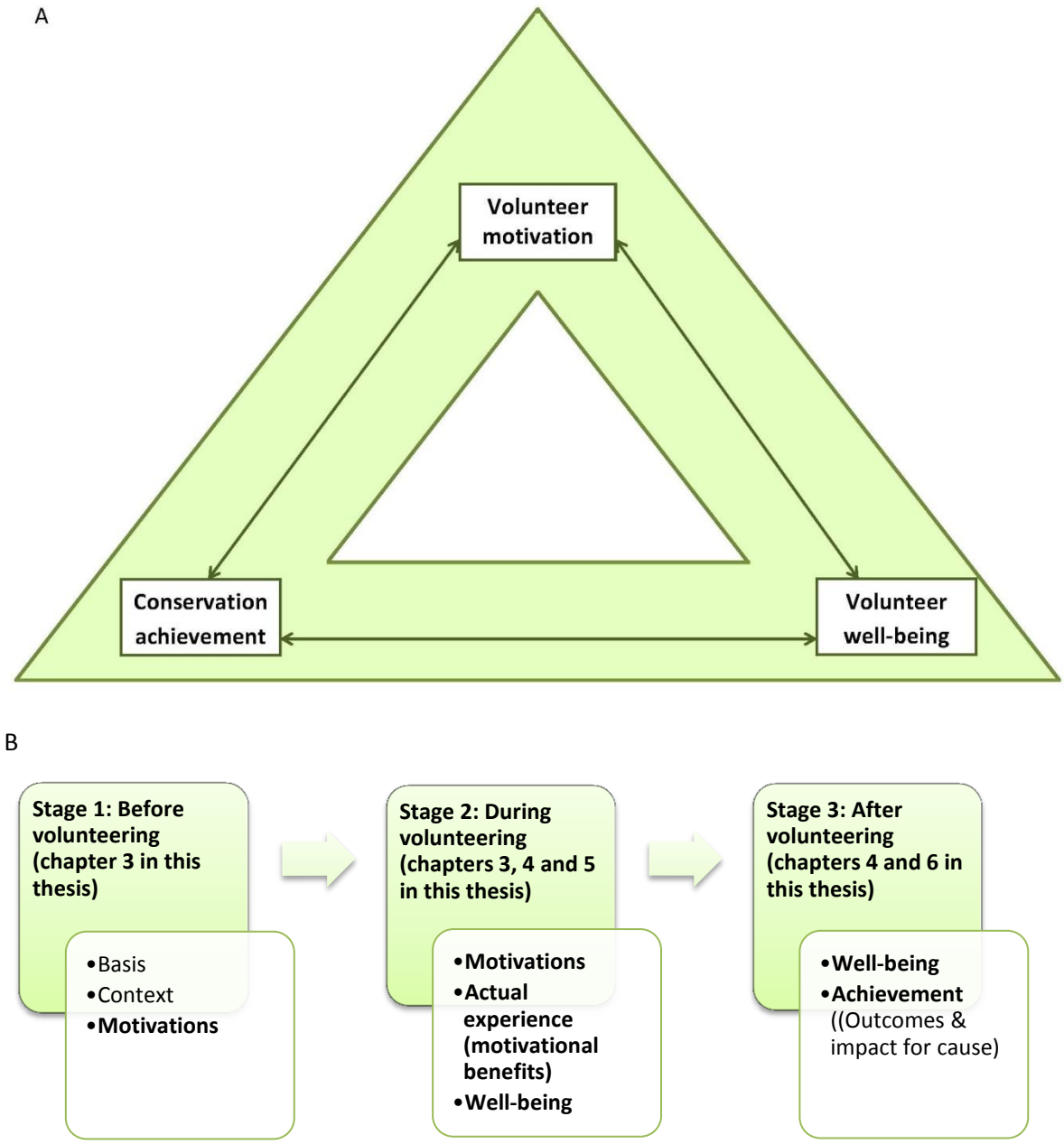


Figure 7.1. The proposed model of environmental volunteering (A) and the stages of volunteering (B) used as basis for this thesis.

This aim was addressed by answering four main research questions focusing on different aspects and relationships of the proposed model, each presented within a chapter of this thesis. Table 7.1 summarises the research questions, previous knowledge, results and how this thesis has contributed new knowledge and understanding.

Overall, this thesis uncovered hitherto unknown discrepancies between perception and reality by volunteers and volunteer managers of volunteer motivation, well-being and conservation achievement. However, volunteers and volunteer managers both perceived that more motivated volunteers with higher levels of well-being would lead to increased conservation achievement, but this research found no such direct link between volunteer motivation and well-being and conservation achievement. This surprising result may be due to a shift in environmental volunteering towards a more experience-focused pattern of engagement and it leads to the need for modifying the proposed model of environmental volunteering. The discussion sections below will further explore these points and the chapter ends with a final conclusion.

Table 7.1. How knowledge of environmental volunteer motivation and motivational benefits, volunteer well-being, conservation achievement and synergies between these has been furthered by the results of this PhD.

Research questions	Knowledge gaps	Results from PhD	Thesis reference
1. What motivates different types of environmental volunteers compared to non-environmental volunteers, how do volunteer managers perceive the motivations of their volunteers and how does this compare to volunteers' actual motivations?	Previous research has not distinguished between different types of environmental volunteers and compared findings to those from non-environmental volunteers. No previous research appears to have been published on perceptions of environmental volunteer motivation by volunteer managers.	Social motivations are more important to practical conservation volunteers than to biodiversity monitoring volunteers and understanding motivations are more important to volunteers performing both biodiversity monitoring and practical conservation than to practical conservation volunteers. Recreation motivation is important to environmental volunteers, but not to non-environmental volunteers. Both volunteers and volunteer managers perceive that value-based motivations are the most important for all types of volunteers. However, unlike volunteers, managers do not perceive the hierarchy among other types of motivations that volunteers identify and do not identify the 'understanding' factor, which is important to volunteers.	Chapter 3
2. How does environmental volunteering affect participants' immediate sense of well-being compared to the effect of other nature-based activities on participants' immediate sense of well-being, how do volunteers remember their volunteering-related well-being later on, how do volunteer managers perceive the well-being of their volunteers and how does this compare to volunteers' actual sense of well-being?	Previous research has not used a multidimensional holistic approach to investigate volunteer well-being that distinguishes between different types of volunteers nor compares findings to control groups. No previous research appears to have been published on perceptions of volunteer well-being by volunteer managers.	The multidimensional approach used in this thesis identifies that environmental volunteering is associated with increases in positive elements and decreases in negative elements of well-being with the positive effects being larger than for participants in other nature-based activities. Furthermore, these positive effects of volunteering are remembered at least six months later. Interestingly, volunteer managers do not perceive the significant decrease in negative elements and improvement in health that volunteers report during volunteering.	Chapter 4

Research questions	Knowledge gaps	Results from PhD	Thesis reference
3. How well are volunteer motivations fulfilled through motivational benefits for different groups and what are the synergies between volunteer motivation, motivational benefits and volunteer well-being?	Previous research has not investigated motivational benefits for different types of volunteers, nor the link between volunteer motivation and elements of well-being. No previous research appears to have been published on the importance of motivational fulfilment for former volunteers compared to current volunteers.	Results demonstrated that understanding, social and protective motivational benefits differ between volunteer types, with biodiversity monitoring volunteers reporting lower benefits than most other volunteer types. Volunteers having other-oriented motives report higher levels of well-being than volunteers having self-oriented motives, who report higher levels of negative emotions. This research proposes a new Motivational Fulfilment Index to measure fulfilment of motivations. Results showed that fulfilment of understanding and career motivations are necessary to retain volunteers.	Chapter 5
4. How do different volunteer motivations, motivational benefits, motivational fulfilment and volunteer well-being associate with and predict conservation activity and outcome goal achievement?	No previous research, which includes all these concepts, appears to have been published.	Volunteers and volunteer managers share the perception of an existing positive link from volunteer motivation and well-being to conservation achievement. However, results suggest that no such link exists in reality.	Chapter 6

7.2 Discrepancies between perception and reality by volunteers and volunteer managers of volunteer motivation, well-being and conservation achievement

This thesis uncovered hitherto unknown discrepancies between perception and reality of volunteer motivation, volunteer well-being and conservation achievement by volunteers and volunteer managers. One of the reasons for this discovery is the novelty of investigating both volunteers' and volunteer managers' perspectives on these aspects. For example until now, research on volunteer motivation has focused on the reasons people engage in volunteering or continue volunteering (e.g. Clary et al. 1992; Roggenbuck et al. 2001; Yeung 2004). Many of these and other studies have called for more research on volunteer motivation to enhance the understanding of why people volunteer (e.g. Measham and Barnett 2008; Wright et al. 2015). However, precious little research has been conducted into how volunteer managers' understand the motivations of their volunteers, apart from one pilot study (Liao-Troth and Dunn 1999) and two single manager case studies (Anderson and Cairncross 2005). This thesis has contributed to current knowledge by investigating volunteer managers' perceptions of their volunteers' motivation. It has uncovered differences between volunteers and volunteer managers in their perceptions of volunteer motivations, which suggests that the accumulated research on volunteer motivation has not reached a key audience, i.e. the volunteer managers.

Similarly to research on volunteer motivation, research on volunteer health and well-being has focused on the volunteers themselves with no research on how volunteer managers perceive the well-being of their volunteers. Again, this thesis has highlighted the differences between volunteers and volunteer managers in their perceptions of volunteer well-being, which again suggests that the accumulated research on volunteer well-being has not reached the audience where the knowledge could make an impact, i.e. the volunteer managers. Although much volunteer training emphasises that volunteer motivations are important, currently it does not enable volunteer managers to understand the differences in motivations and importance of different motivations (personal communication, N. Bergin, former volunteer manager, DWT, 9 April 2016). Likewise, books on understanding or managing volunteers may highlight that motivations are important but may not go into sufficient detail to be useful to practitioners (e.g. McKee and McKee 2012).

A final point of discrepancy found in this research between volunteers' and volunteer managers' perceptions was in their evaluation of conservation achievement. This research evaluated conservation achievement through volunteers' and volunteer managers'

perceptions, though these may be subjective and based on the experiences and values of individual volunteers and managers (Suding 2011) if there are no objective frameworks or guidelines to measure outcomes by. Only through objective measures of conservation achievement, for example by using the tool developed by the Cambridge Conservation Forum (Kapos et al. 2008), can volunteer impact be evaluated constructively and decisions made on whether volunteer involvement is the best way to achieve the desired conservation outcomes. Even if there were objective measures, this difference in perceived conservation achievement may still persist, if goals and outcomes are not clearly and honestly communicated to volunteers by their managers. However, the honest communication of failed achievements may be counterproductive to continued volunteer engagement, as negative feedback can lead to negative emotions (Emmons 1986) and can be experienced as unfulfilling in relation to volunteers' value motivations, ultimately leading to discontinuation of volunteering. Some volunteer managers seem aware of this fact as evidenced by the following comment:

> "I think that we often convince volunteers we have achieved what we set out to achieve, even if it is not strictly true!"
>
> (Volunteer manager)

Continually fulfilling volunteers' motivations is part of the volunteer manager role, which may sometimes require volunteer managers to make compromises, such as between honest feedback and keeping volunteers motivated and engaged. Further research is needed to establish to what extent this practice occurs and the effects of it. This may lead to the conclusion that this particular discrepancy will persist due to volunteer management practices. Providing volunteer managers with research findings on volunteering in an easily accessible and useful form will allow them to gain a better understanding of their volunteers, manage their volunteers better and ultimately be able to create more fulfilling volunteer experiences.

7.3 Volunteering as an experience and management implications

This research reflects findings from many other contexts exhibiting changes from materialistic or service-based approaches to more experience-based approaches (Pine and Gilmore 2011), including tourism (Stamboulis and Skayannis 2003), creative industries (Birch 2008) and health care (Boswijk 2013). Volunteers are increasingly seeking out more experience-based opportunities that provide possibilities for fulfilling more or other motivations than value-based motivations (Bell et al. 2008). This is also exemplified by a comment from a respondent to the online survey:

> "It gives a structure to the week - I know what day it is!!
> I get out when otherwise I might not
> It is a 'free' activity (I get fitness, education, social meetings etc. with minimal or no cost). Important if you are retired on a low income"
>
> (Volunteer, biodiversity monitoring and practical conservation)

As this quote highlights, volunteering provides a range of benefits to this volunteer, which fulfils three motivations; 'recreation' (fitness), 'understanding' (education) and 'social' motives. This is in line with the overall finding in this thesis that 'understanding' and 'recreation' are important to environmental volunteers, even though environmental volunteers did not rate 'social' motivations as highly, they were positively related to conservation achievement. Satisfying social relationships, such as help and support from volunteer managers when needed and providing opportunities for volunteers to socialise and reflect on their experience, are important for volunteers, as exemplified by the following comment from a respondent to the online survey:

> "We always conclude our sessions with a cup of tea and some cake together. That is very important for everyone so that we can have a chat and talk about our experiences. We also feel rewarded."
>
> (Volunteer, practical conservation)

All volunteer managers in the onsite study of this research understood the importance of the social interactions during volunteering by ensuring time for lunch breaks, and in practical conservation volunteering by also providing a morning tea break with cookies for volunteers. However, they also acknowledged that time spent on social activities detracted from time spent on completing conservation tasks, as demonstrated by this comment from a volunteer manager also performing volunteer tasks:

> "Happy volunteers may achieve more, but many of the happiness-causing aspects (chatting to likeminded people, tea breaks, etc) potentially take time away from working towards those conservation achievements. However, they do make the volunteers more likely to come back next time, which is critical for achieving more overall"
>
> (Volunteer as well as volunteer manager)

As government funding for social services decrease (Franklin 2015), it is likely that more people will, like the above quoted volunteer, look to volunteering to fulfil their social needs. Volunteer managers will then need to balance the volunteers' push for social interaction time with the time needed to achieve conservation goals. Some volunteer managers are starting to realise this change towards volunteering as an experience rather than an altruistic act of helping a specific cause, as exemplified in this comment from a volunteer manager to the online survey:

> "For volunteers engaging in conservation activities, perhaps it's more about the experience than the end result. … Many of the volunteers I managed in tree planting outings were just happy to get out of the city, be in nature and visit places they had never been before"
>
> (Volunteer manager, practical conservation)

In a future more experience-based and self-focused form of environmental volunteering, it will be increasingly important for volunteer organisations to carefully consider their volunteer audience and how best to engage with their chosen audience. Citizen science is increasingly doing this, for example by exploring how new technologies can enhance the outreach to new audiences and engage people in an experience-based context, while still ensuring data quality (e.g. Prestopnik and Crowston 2011). There are also examples from practical conservation work where the experience-based approach has been implemented successfully such as the 'Green Gym' by The Conservation Volunteers (Yerrell 2008). While some volunteer organisations may choose to engage with this new experience-expecting audience, it may benefit other organisations to maintain a more value-based approach. The value-based approach may lead to fewer volunteers, but the organisation may retain the volunteers who are truly value-motivated, as exemplified by this comment:

> "A lot of conservation volunteering is a waste of time, but probably does the volunteers good in terms of their mental and physical health, by getting them working in the outdoors. I still volunteer myself, but only for jobs that I think ARE actually achieving conservation goals."
>
> (Volunteer)

Thus while the main focus of conservation organisations has been on the environmental benefits from volunteering, the focus of many volunteers and their reasons for continued engagement is shifting to being on volunteering as a complete and fulfilling experience providing a range of benefits to themselves. Although many volunteers are driven by their underlying value-based motivation to volunteer in the first place, their continued engagement is only ensured by volunteer organisations fulfilling their other motivations as well, such as experiencing satisfying social relationships or learning new things.

Volunteers' desire to learn new things, use their skills and understand the world better, i.e. the 'understanding' motivation, was identified as an important motivational factor for all volunteers (chapter 3). This finding was further reinforced by results demonstrating that former volunteers had not had their 'understanding' motivations fulfilled, as opposed to current volunteers who had (chapter 5). This indicates that fulfilling volunteers' 'understanding' motivation is a key factor in retaining volunteers. One potential way of ensuring better 'understanding' benefits for volunteers could be by providing a more varied experience in terms of different tasks and learning experiences for volunteers, as this research found that biodiversity monitoring volunteers who also did practical conservation work gained better understanding benefits than other volunteers. This supports a suggestion made by Weng (2015) that organisations could offer a variety of activities and engagement at different levels for volunteers with different interests to expand the framing of practical conservation tasks. This combination of tasks allows environmental volunteers to see the immediate change in the environment from their practical conservation work and it further allows them to understand the longer-term implications of their practical conservation work by their follow-up monitoring and registration of changes in biodiversity.

7.4 Reviewing the proposed environmental volunteering model

This thesis investigated the relationships between environmental volunteer motivation, volunteer well-being and conservation achievement as perceived by volunteers and volunteer managers partly to test a proposed model of environmental volunteering (Figure 7.1A). Based on results presented in this thesis, it is clear that both volunteers and volunteer managers perceived the proposed model to be valid, and results confirmed the direct link between volunteer motivation and well-being. However, results also showed that actual volunteer motivation and volunteer well-being were not direct influences on actual conservation achievement, calling for the model to be modified to reflect this reality rather than current perceptions. Part of this reality is that people will only get involved if they are motivated to do

so and this thesis has shown that fulfilling volunteer motivations is important for volunteers to continue volunteering. This highlights an important indirect link between volunteer motivation and conservation achievement. Although only weak associations were found between volunteer well-being and conservation achievement, through the direct relationship between volunteer well-being and motivation an indirect link also exists between volunteer well-being and conservation achievement. The modified model of environmental volunteering resulting from this thesis therefore shows the solid link between volunteer motivation and well-being, and the links from volunteer motivation and volunteer well-being to conservation achievement as indirect links (Figure 7.2).

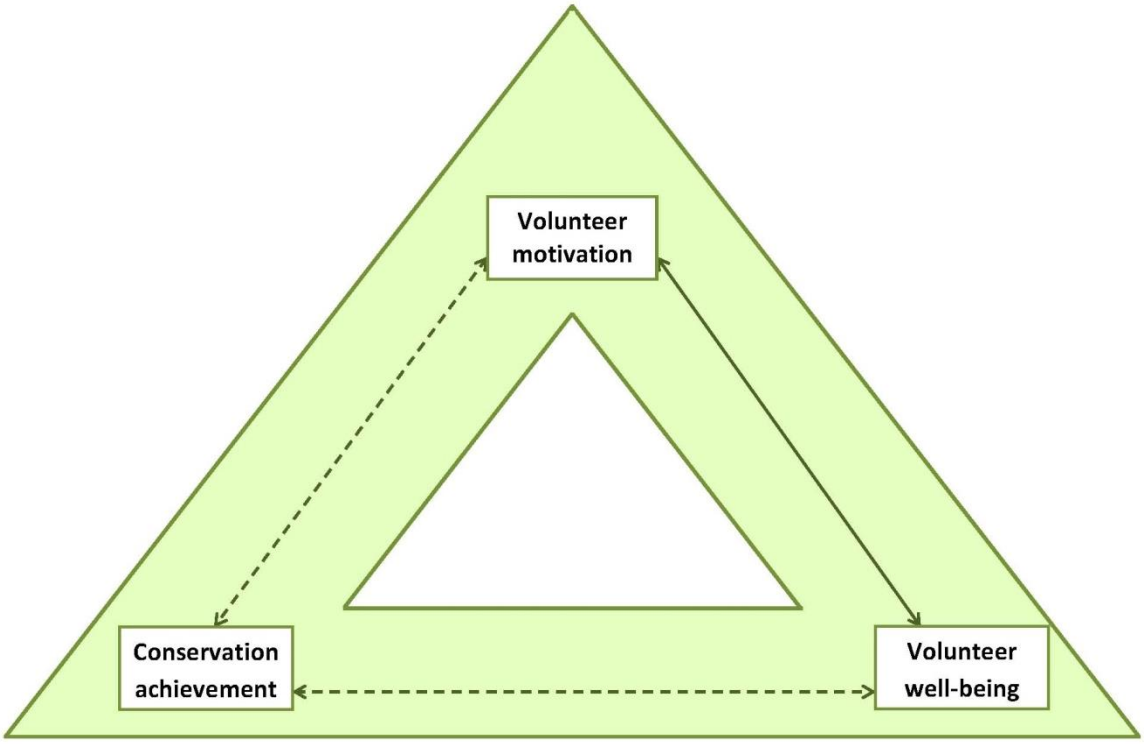


Figure 7.2. The modified model of environmental volunteering resulting from findings in this thesis. The links from volunteer motivation and volunteer well-being to conservation achievement are indirect (dotted lines), and only the link between volunteer motivation and well-being remains as a direct link.

This modified model of environmental volunteering shows that a holistic approach to volunteer management, which includes consideration of both conservation outcomes and the volunteering experience through attention to volunteer motivations and well-being, is needed to ensure successful outcomes.

7.5 Future work

The modified model of environmental volunteering provides a useful starting point for exploring the multidimensional aspects of volunteering further, with the indirect links from volunteer motivation and well-being to conservation achievement being of particular interest.

This thesis based the evaluation of conservation achievement on volunteer managers' assessments, which was subjective rather than objective as no overarching framework was available for volunteer managers. An important area for future research would be the development of systematic and objective measures of the conservation achievements from environmental volunteering over various timescales such as immediate outputs, medium-term outcomes and long-term impacts. Once these measures were in place, further investigation could proceed into the indirect links found in this research from volunteer motivation and well-being to conservation achievement.

Another fruitful avenue for future research would be to investigate the potential of volunteering as an experience and how best to develop that experience, similarly to research agendas in other areas, for example tourism (Stamboulis and Skayannis 2003). With society heading for the experience economy (Pine and Gilmore 2011), volunteer organisations could then prepare themselves and their volunteer opportunities for the new type of experience-focused volunteer who is more likely to become more prevalent in the future.

Finally, the research presented in this thesis focused on people spending the majority of their environmental volunteer time outdoors and future work could examine factors affecting the equally important indoor-based volunteering sector. A future avenue for research could be to compare the motivations and well-being of volunteers working outdoors with the motivations and well-being of volunteers spending most of their volunteer time indoors volunteering for the same organisations. This could address questions relating to for example investigating potential differences in the well-being benefits of environmental volunteering for indoors and outdoors volunteers in the same organisations.

7.6 Conclusions

This thesis has investigated the different relationships between environmental volunteer motivation, volunteer well-being and conservation achievement as perceived and experienced by volunteers and volunteer managers. Specifically it has shown differences in volunteer motivation among environmental volunteers and between environmental and non-environmental volunteers as well as shown that volunteer managers failed to identify understanding as a motivation and misjudged the importance of other motivations to volunteers (chapter 3). The work has also demonstrated that volunteering had significant positive effects on well-being, even more so than other nature-based activities, and that volunteer managers underestimated the decrease in negative elements of well-being among

volunteers (chapter 4). Furthermore, this study has shown that the motivational benefits gained by different types of volunteers differ and that understanding and career benefits must be ensured to retain volunteers whilst appreciating that different motivations influence volunteer well-being differently (chapter 5). Finally, this thesis has demonstrated that volunteers and volunteer managers share the perception of an existing positive link from volunteer motivation and well-being to conservation achievement but it has also shown that no such direct link exists in reality (chapter 6). In addition to these main conclusions and results relating to the four main research questions summarised in Table 7.1, the following further conclusions can be drawn from the research:

1. The discrepancy between perception and reality of volunteer motivation and well-being by volunteers and volunteer managers should be addressed by volunteer organisations and researchers to ensure optimal benefits of volunteering. Researchers need to communicate their findings on these aspects to relevant organisations and these in turn need to provide targeted and in-depth volunteer manager training on volunteer motivation and well-being.

2. Volunteering is ideally posed in the new experience economy to provide new and interesting experiences to potentially new audiences, and volunteers will increasingly be expecting personal benefits and customised volunteer experiences. Volunteer organisations will need to consider how to deal with the challenges and opportunities that come with this change and decide on the best strategy for them to adopt.

3. Objective measures of conservation achievement from volunteering are lacking, which makes monitoring of outcomes and impact difficult. Another important consequence of this deficit is that it leads to a difference in conservation achievement perception between volunteers and volunteer managers as they base their evaluations on subjective measures. New objective measures of conservation achievement need to be developed, communicated and implemented throughout volunteer organisations to enhance the impact of environmental volunteering.

4. The modified model of environmental volunteering resulting from this thesis shows how optimising outcomes of environmental volunteering is a fine balance between ensuring continued volunteer engagement through fulfilling volunteer motivations and enhancing volunteer well-being on the one hand and achieving actual conservation outcomes on the other.

References

Abell, J., 2013. Volunteering to Help Conserve Endangered Species: An Identity Approach to Human–Animal Relationships. *Journal of Community & Applied Social Psychology*, *23* (2), 157–170.

Ahern, N. R., 2005. Using the internet to conduct research. *Nurse Researcher*, *13* (2), 55–70.

Allison, L. D., Okun, M. A. and Dutridge, K. S., 2002. Assessing volunteer motives: a comparison of an open-ended probe and Likert rating scales. *Journal of Community & Applied Social Psychology*, *12* (4), 243–255.

Anderson, E. and Cairncross, G., 2005. Understanding and Managing Volunteer Motivation: Two Regional Tourism Cases. *Australian Journal on Volunteering*, *10* (2), 7–17.

Aristotle, 2009. *The Nicomachean Ethics*. Translated by David Ross; revised with an introduction and notes by Lesley Brown. New York: Oxford University Press.

Asah, S. T. and Blahna, D. J., 2012. Motivational functionalism and urban conservation stewardship: implications for volunteer involvement. *Conservation Letters*, *5* (6), 470–477.

Ballard, H. L., Robinson, L. D., Young, A. N., Pauly, G. B., Higgins, L. M., Johnson, R. F. and Tweddle, J. C., 2016. Contributions to conservation outcomes by natural history museum-led citizen science: Examining evidence and next steps, *Biological Conservation* [online]. In press. Available from: http://www.sciencedirect.com/science/article/pii/S0006320716303512 [Accessed 22 November 2016].

Batson, C. D., Ahmad, N. and Tsang, J., 2002. Four Motives for Community Involvement. *Journal of Social Issues*, *58* (3), 429–445.

Baumeister, R., Bratslavsky, E. and Finkenauer, C., 2001. Bad is stronger than good. *Review of General Psychology*, *5* (4), 323–370.

Baumeister, R. F. and Leary, M. R., 1995. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117* (3), 497–529.

Bell, S., Marzano, M., Reinert, H., Cent, J., Kobierska, H., Grodzińska-Jurczak, M., Podjed, D., Muršič, R., Vandzinskaite, D. and Armaitiene, A., 2008. What counts? Volunteers and their organisations in the recording and monitoring of biodiversity. *Biodiversity and Conservation*, *17* (14), 3443–3454.

Bernaards, C. A. and Jennrich, R. I., 2005. Gradient Projection Algorithms and Software for Arbitrary Rotation Criteria in Factor Analysis. *Educational and Psychological Measurement*, *65* (5), 676–696.

Binder, M. and Freytag, A., 2013. Volunteering, subjective well-being and public policy. *Journal of Economic Psychology*, *34* , 97–119.

Birch, S., 2008. *The political promotion of the experience economy and creative industries: Cases from UK, New Zealand, Singapore, Norway, Sweden and Denmark*. Frederiksberg C: Imagine.. and Samfundslitteratur.

Boakes, E., Gliozzo, G., Seymour, V. and Harvey, M., 2016. Patterns of contribution to citizen science biodiversity projects increase understanding of volunteers' recording behaviour. *Scientific Reports*, *6* (33051), 1–11.

Borgonovi, F., 2008. Doing well by doing good. The relationship between formal volunteering and self-reported health and happiness. *Social Science and Medicine*, *66* (11), 2321–2334.

References

Boswijk, A., 2013. Radical change in health care to achieve superior patient experience. *In*: Sundbo, J., and Sørensen, F., eds. *Handbook on the Experience Economy*. Cheltenham: Edward Elgar Publishing Limited, 464–472.

Bowler, D. E., Buyung-Ali, L. M., Knight, T. M. and Pullin, A. S., 2010. A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC Public Health*, *10* (1), 456.

Bradburn, N. M., 1969. *The structure of psychological well-being.* Oxford, England: Aldine.

Bramston, P., Pretty, G. and Zammit, C., 2011. Assessing Environmental Stewardship Motivation. *Environment and Behavior*, *43* (6), 776–788.

Brayley, N., Obst, P., White, K. M., Lewis, I. M., Warburton, J. and Spencer, N. M., 2014. Exploring the validity and predictive power of an extended volunteer functions inventory within the context of episodic skilled volunteering by retirees. *Journal of Community Psychology*, *42* (1), 1–18.

Brooks, A., 2007. Does giving make us prosperous? *Journal of Economics and Finance*, *31* (3), 403–411.

Bruyere, B. and Rappe, S., 2007. Identifying the motivations of environmental volunteers. *Journal of Environmental Planning & Management*, *50* (4), 503–516.

Buesching, C. D., Newman, C. and Macdonald, D. W., 2014. How dear are deer volunteers: the efficiency of monitoring deer using teams of volunteers to conduct pellet group counts. *Oryx*, *48* (4), 593–601.

Burych, C. A., Caird, A., Schwebel, J. F., Fliess, M. and Hardie, H. M., 2016. *Measuring the impact of volunteers: a balanced and strategic approach*. Philadelphia: Energize, Inc.

Butcher, J. and Smith, P., 2010. "Making a Difference": Volunteer Tourism and Development. *Tourism Recreation Research*, *35* (1), 27–36.

Butler, J. and Kern, M. L., 2016. The PERMA-Profiler: A brief multidimentional measure of flourishing. *International Journal of Wellbeing*, *6* (3), 1–48.

Cabinet Office, 2014. *Community Life Survey: England, 2013-2014. Statistical Bulletin*. London, UK.

Catlin-Groves, C. L., 2012. The citizen science landscape: from volunteers to citizen sensors and beyond. *International Journal of Zoology*, *2012* , 1–14.

Cattell, R., 1966. The scree test for the number of factors. *Multivariate Behavioral Research*, *1* (2), 245–276.

Chatters, C., 2013.a *Mobilising volunteers to control Himalayan balsam across river catchments*. Curdridge, UK.: Hampshire & Isle of Wight Wildlife Trust

Chatters, C., 2013.b *Motivating volunteers to control Himalayan balsam in the New Forest area*. Curdridge, UK.: Hampshire & Isle of Wight Wildlife Trust

Cigliano, J. A., Meyer, R., Ballard, H. L., Freitag, A., Phillips, T. B. and Wasser, A., 2015. Making marine and coastal citizen science matter. *Ocean & Coastal Management*, *115* , 77–87.

Clary, E. G. and Snyder, M., 1999. The motivations to volunteer: Theoretical and practical considerations. *Current Directions in Psychological Science*, *8* (5), 156–159.

Clary, E. G., Snyder, M. and Ridge, R., 1992. Volunteers' motivations: a functional strategy for the recruitment, placement, and retention of volunteers. *Nonprofit Management & Leadership*, *2* (4), 333–350.

Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J. and Miene, P., 1998. Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology*, *74* (6), 1516–1530.

Clary, E. G., Snyder, M. and Stukas, A., 1996. Volunteers' Motivations: Findings from a National Survey. *Nonprofit & Voluntary Sector Quarterly*, *25* (4), 485–505.

Cnaan, R. A. and Goldberg-Glen, R. S., 1991. Measuring motivation to volunteer in human services. *Journal of Applied Behavioral Science*, *27* (3), 269–284.

Cnaan, R. A. and Handy, F., 2005. Towards Understanding Episodic Volunteering. *Vrijwillige Inzet Onderzocht*, *2* , 29–35.

Cnaan, R. A., Handy, F. and Wadsworth, M., 1996. Defining Who is a Volunteer: Conceptual and Empirical Considerations. *Nonprofit and Voluntary Sector Quarterly*, *25* (3), 364–383.

Connolly, S. and O'Shea, E., 2015. The Perceived Benefits of Participating in Voluntary Activities Among Older People: Do They Differ by Volunteer Characteristics? *Activities, Adaptation & Aging*, *39* (2), 95–108.

Corporation for National & Community Service, 2014. Volunteering in America, *Volunteering and Civic Life in America* [online]. Washington, DC Available from: http://www.volunteeringinamerica.gov [Accessed 2 December 2015].

Cortina, J. M., 1993. What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, *78* (1), 98–104.

Crawley, M. J., 2007. *The R book*. Chichester: John Wiley & Sons, Ltd.

Cronbach, L., 1951. Coefficient alpha and the internal structure of tests. *Psychometrika*, *16* (3), 297–334.

Csikszentmihalyi, M., 1975. *Beyond boredom and anxiety*. San Francisco: Jossey-Bass Publishers.

Csikszentmihalyi, M., 1991. *Flow: the psychology of optimal experience*. New York: HarperPerennial.

Currie, M. J. B., Lackova, P. and Dinnie, E., 2016. Greenspace matters: exploring links between greenspace, gender and well-being with conservation volunteers. *Landscape Research*, *41* (6), 641–651.

Dalgleish, J., 2007. *The opportunities for environmental volunteering to deliver Scottish executive policies: a discussion paper*. Stirling, UK.: BTCV Scotland

Davies, L., Bell, J. N. B., Bone, J., Head, M., Hill, L., Howard, C., Hobbs, S. J., Jones, D. T., Power, S. A., Rose, N., Ryder, C., Seed, L., Stevens, G., Toumi, R., Voulvoulis, N. and White, P. C. L., 2011. Open Air Laboratories (OPAL): A community-driven research programme. *Environmental Pollution*, *159* (8–9), 2203–2210.

Day, A. M. B., Theurer, J. A., Dykstra, A. D. and Doyle, P. C., 2012. Nature and the natural environment as health facilitators: The need to reconceptualize the ICF environmental factors. *Disability and Rehabilitation: An International, Multidisciplinary Journal*, *34* (26), 2281–2290.

Day, K. M. and Devlin, R. A., 1998. The Payoff to Work without Pay: Volunteer Work as an Investment in Human Capital. *The Canadian Journal of Economics / Revue Canadienne d'Economique VO*, *31* (5), 1179.

Dickinson, J. L., Zuckerberg, B. and Bonter, D. N., 2010. Citizen Science as an Ecological Research Tool: Challenges and Benefits. *Annual Review of Ecology, Evolution, and Systematics*, *41* (1), 149–172.

Diener, E., 1984. Subjective well-being. *Psychological Bulletin*, *95* (3), 542–575.

Diener, E., 1994. Assessing subjective well-being: Progress and opportunities. *Social Indicators Research*, *31* (2), 103–157.

Diener, E., 2000. Subjective well-being: The science of happiness and a proposal for a national

index. *American Psychologist*, *55* (1), 34–43.

Diener, E., Suh, E. M., Lucas, R. E. and Smith, H. L., 1999. Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125* (2), 276–302.

do Paço, A., Agostinho, D. and Nave, A., 2013. Corporate versus non-profit volunteering—do the volunteers' motivations significantly differ? *International Review on Public and Nonprofit Marketing*, *10* (3), 221–233.

Dolnicar, S. and Randle, M., 2007. What Motivates Which Volunteers? Psychographic Heterogeneity Among Volunteers in Australia. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *18* (2), 135–155.

Dwyer, P. C., Bono, J. E., Snyder, M., Nov, O. and Berson, Y., 2013. Sources of Volunteer Motivation: Transformational Leadership and Personal Motives Influence Volunteer Outcomes. *Nonprofit Management & Leadership*, *24* (2), 181–205.

Dziuban, C. and Shirkey, E., 1974. When is a correlation matrix appropriate for factor analysis? Some decision rules. *Psychological Bulletin*, *81* (6), 358–361.

Ellis, R. and Waterton, C., 2004. Environmental citizenship in the making: the participation of volunteer naturalists in UK biological recording and biodiversity policy. *Science and Public Policy*, *31* (2), 95–105.

Emmons, R. A., 1986. Personal Strivings: An Approach to Personality and Subjective Well-Being. *Journal of Personality & Social Psychology*, *51* (5), 1058–1068.

Esmond, J. and Dunlop, P., 2004. *Developing the Volunteer Motivation Inventory to Assess the Underlying Motivational Drives of Volunteers in Western Australia*. Perth, Australia: Clan WA Inc.

Evans, C., Abrams, E., Reitsma, R., Roux, K., Salmonsen, L. and Marra, P. P., 2005. The Neighborhood Nestwatch Program: participant outcomes of a citizen-science ecological research project. *Conservation Biology*, *19* (5), 589–594.

Finkelstein, M. A., 2007. Correlates of Satisfaction in Older Volunteers: A Motivational Perspective. *The International Journal of Volunteer Administration*, *24* (5), 6–12.

Finkelstein, M. A., 2008.a Predictors of volunteer time: The changing contributions of motive fulfillment and role identity. *Social Behavior and Personality*, *36* (10), 1353–1363.

Finkelstein, M. A., 2008.b Volunteer satisfaction and volunteer action: A functional approach. *Social Behavior and Personality*, *36* (1), 9–18.

Finkelstein, M. A., Penner, L. A. and Brannick, M. T., 2005. Motive, role identity, and prosocial personality as predictors of volunteer activity. *Social Behavior and Personality*, *33* (4), 403–418.

Fitch, R., 1987. Characteristics and motivations of college students volunteering for community service. *Journal of College Student Personnel*, *28* (5), 424–431.

Foddy, W., 1995. *Constructing questions for interviews and questionnaires: theory and practice in social research*. Cambridge: Cambridge University Press.

Forestry Commission, 2014. *Forestry Commission volunteer questionnaire: Full report*. England: Forestry Commission.

Forgeard, M. J. C., Jayawickreme, E., Kern, M. L. and Seligman, M. E. P., 2011. Doing the Right Thing: Measuring Well-Being for Public Policy. *International Journal of Wellbeing*, *1* (1), 79–106.

Franklin, B., 2015. *The end of formal adult social care*. London, UK.: ILC-UK

Frumkin, H., 2001. Beyond toxicity: Human health and the natural environment. *American Journal of Preventive Medicine*, *20* (3), 234–240.

Gage, R. L. and Thapa, B., 2012. Volunteer Motivations and Constraints Among College Students: Analysis of the Volunteer Function Inventory and Leisure Constraints Models . *Nonprofit and Voluntary Sector Quarterly* , *41* (3), 405–430.

Galaxy Zoo, 2015. Galaxy Zoo, Available from: http://www.galaxyzoo.org [Accessed 28 January 2015].

Geoghegan, H., Dyke, A., Pateman, R. and West, S. E., 2016. *Understanding Motivations for Citizen Science*. Swindon, UK: Final report on behalf of UKEOF, University of Reading, Stockholm Environment Institute (University of York) and University of the West of England.

Gidron, B., 1978. Volunteer work and its rewards. *Volunteer Administration*, *XI* (3), 18–31.

Gidron, B., 1985. Predictors of Retention and Turnover Among Service Volunteer Workers. *Journal of Social Service Research*, *8* (1), 1–16.

Gill, N., 2005. Slag, steel and swamp: Perceptions of restoration of an urban coastal saltmarsh. *Ecological Management and Restoration*, *6* (2), 85–93.

Gillath, O., Shaver, P., Mikulincer, M., Nitzberg, R., Erez, A. and van IJzendoorn, M., 2005. Attachment, caregiving, and volunteering: Placing volunteerism in an attachment-theoretical framework. *Personal Relationships*, *12* , 425–446.

Gillespie, D. F. and King, A. E. O., 1985. Demographic understanding of volunteerism. *Journal of Sociology & Social Welfare*, *12* (4), 798–816.

Gimenez-Nadal, J. I. and Molina, J. A., 2015. *Voluntary Activities and Daily Happiness in the US*. Discussion Paper No. 8764. Bonn: IZA.

Goldstar, 2010. *A guide to impact assessment within volunteer involving organisations*. Birmingham: Goldstar.

Gooch, M., 2005. Voices of the Volunteers: an Exploration of the Experiences of Catchment Volunteers in Coastal Queensland, Australia. *Local Environment*, *10* (1), 5–19.

Govekar, P. L. and Govekar, M. A., 2002. Using Economic Theory and Research to Better Understand Volunteer Behavior. *Nonprofit Management and Leadership*, *13* (1), 33–48.

Gray, P. W. G. and Jones, E. B. G., 1977. The attempted clearance of Sargassum muticum from Britain. *Environmental Conservation*, *4* (4), 303–308.

Greenfield, E. A. and Marks, N. F., 2004. Formal volunteering as a protective factor for older adults' psychological well-being. *Journals of Gerontology - Series B Psychological Sciences and Social Sciences*, *59* (5), 258–264.

Grese, R. E., Kaplan, R., Ryan, R. L. and Buxton, J., 2000. Psychological benefi□ts of volunteering in stewardship programs. *In*: Gobster, P. H., and Hull, R. B., eds. *Restoring nature: perspectives from the social sciences and humanities*. Washington, D.C.: Island Press, 267–280.

Guiney, M. S., 2009. *Caring for nature: motivations for and outcomes of conservation volunteer work*. [online]. Thesis (PhD). University of Minnesota.

Guiney, M. S. and Oberhauser, K. S., 2009. Conservation volunteers' connection to nature. *Ecopsychology*, *1* (4), 187–197.

Güntert, S. T., Neufeind, M. and Wehner, T., 2015. Motives for Event Volunteering: Extending the Functional Approach. *Nonprofit and Voluntary Sector Quarterly*, *44* (4), 686–707.

Güntert, S. T., Strubel, I. T., Kals, E. and Wehner, T., 2016. The quality of volunteers' motives: Integrating the functional approach and self-determination theory. *The Journal of Social Psychology*, *156* (3), 310–327.

Haklay, M., 2015. *Citizen science and policy: A European perspective*. (No. 4). Woodrow Wilson

International Center for Scholars: Washington, DC.

Harlow, R. and Cantor, N., 1996. Still participating after all these years: A study of life task participation in later life. *Journal of Personality and Social Psychology*, *71* (6), 1235–1249.

Hart, A., Stafford, R., Goodenough, A. and Morgan, S., 2012. The Role of Citizen Science and Volunteer Data Collection in Zoological Research. *International Journal of Zoology*, *2012* , 1–3.

Harvey, N., Clarke, B. D. and Carvalho, P., 2001. The role of the Australian Coastcare program in community-based coastal management: a case study from South Australia. *Ocean & Coastal Management*, *44* (3–4), 161–181.

Ho, H.-C., 2015. Elderly volunteering and psychological well-being. *International Social Work*, in press. doi: 10.1177/0020872815595111.

Ho, Y. W., You, J. and Fung, H. H., 2012. The moderating role of age in the relationship between volunteering motives and well-being. *European Journal of Ageing*, *9* (4), 319–327.

Hobbs, S. J. and White, P. C. L., 2012. Motivations and barriers in relation to community participation in biodiversity recording. *Journal for Nature Conservation*, *20* (6), 364–373.

Hobbs, S. J. and White, P. C. L., 2015. Achieving positive social outcomes through participatory urban wildlife conservation projects. *Wildlife Research*, *42* (7), 607–617.

Hone, L. C., Jarden, A., Schofield, G. M. and Duncan, S., 2014. Measuring flourishing: The impact of operational definitions on the prevalence of high levels of wellbeing. *International Journal of Wellbeing*, *4* (1), 62–90.

Horn, J., 1965. A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30* (2), 179–185.

Houle, B. J., Sagarin, B. J. and Kaplan, M. F., 2005. A Functional Approach to Volunteerism: Do Volunteer Motives Predict Task Preference? *Basic and Applied Social Psychology*, *27* (4), 337–344.

Hu, L. and Bentler, P. M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6* (1), 1–55.

Hustinx, L., 2010. The organizational behavior of volunteers revisited? Explaining differences in styles of volunteering in the Red Cross in Flanders. *In*: Freise, M.,, Pyykkönen, M., and Vaidelytė, E., eds. *A panacea for all seasons? Civil society and governance in Europe*. Baden-Baden, Germany: Nomos, 239–260.

Hustinx, L., Haski-Leventhal, D. and Handy, F., 2008. One of a kind? Comparing episodic and regular volunteers at the Philadelphia Ronald McDonald House. *IJOVA: International Journal of Volunteer Administration*, *XXV* (3), 50–66.

Hustinx, L. and Lammertyn, F., 2003. Collective and Reflexive Styles of Volunteering: A Sociological Modernization Perspective. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *14* (2), 167–187.

Iwata, Y., Dhubháin, Á. N., Brophy, J., Roddy, D., Burke, C. and Murphy, B., 2016. Benefits of Group Walking in Forests for People with Significant Mental Ill-Health. *Ecopsychology*, *8* (1), 16–26.

Jackson, S., 2014. *Himalayan Balsam pulling volunteers in south-central England*. Southampton, UK.: Southampton Solent University

Jacobsen, S. K., Carlton, J. S. and Monroe, M. C., 2012. Motivation and Satisfaction of Volunteers at a Florida Natural Resource Agency. *Journal of Park & Recreation*

Administration, *30* (1), 51–67.

Jenkinson, C. E., Dickens, A. P., Jones, K., Thompson-Coon, J., Taylor, R. S., Rogers, M., Bambra, C. L., Lang, I. and Richards, S. H., 2013. Is volunteering a public health intervention? A systematic review and meta-analysis of the health and survival of volunteers. *BMC Public Health*, *13* (1), 1–10.

Johnson, M. F., Hannah, C., Acton, L., Popovici, R., Karanth, K. K. and Weinthal, E., 2014. Network environmentalism: Citizen scientists as agents for environmental advocacy. *Global Environmental Change*, *29* , 235–245.

Kahn, R. L. and Cannell, C. F., 1957. *The dynamics of interviewing; theory, technique, and cases*. New York: Wiley.

Kaiser, H. F., 1960. Application of electronic computers to factor analysis. *Educational & Psychological Measurement*, *20* (1), 141–151.

Kaplan, R., 1983. The role of nature in the urban context. *In*: Altman, I., and Wohlwill, J. F., eds. *Behavior and the Natural Environment*. New York: Plenum Press, 127–161.

Kapos, V., Balmford, A., Aveling, R., Bubb, P., Carey, P., Entwistle, A., Hopkins, J., Mulliken, T., Safford, R., Stattersfield, A., Walpole, M. and Manica, A., 2008. Calibrating conservation: new tools for measuring success. *Conservation Letters*, *1* (4), 155–164.

Katz, D., 1960. The Functional Approach to the Study of Attitudes. *The Public Opinion Quarterly*, *24* (2), 163–204.

Kearney, K. A., Hopkins, R. H., Mauss, A. L. and Weisheit, R. A., 1984. Self-Generated Identification Codes for Anonymous Collection of Longitudinal Questionnaire Data. *Public Opinion Quarterly*, *48* (1B), 370–378.

Kellert, S. R. and Wilson, E. O., 1993. *The Biophilia hypothesis*. Washington, D.C.: Island Press.

Keyes, C. L. M., 2002. The Mental Health Continuum: From Languishing to Flourishing in Life. *Journal of Health & Social Behavior*, *43* (2), 207–222.

Konrath, S., Fuhrel-Forbis, A., Lou, A. and Brown, S., 2012. Motives for volunteering are associated with mortality risk in older adults. *Health Psychology*, *31* (1), 87–96.

Korpela, K. M., Stengård, E. and Jussila, P., 2016. Nature Walks as a Part of Therapeutic Intervention for Depression. *Ecopsychology*, *8* (1), 8–15.

Koss, R., Miller, K. and Wescott, G., 2009. An evaluation of Sea Search as a citizen science programme in Marine Protected Areas. *Pacific Conservation Biology*, *15* , 116–127.

Koss, R. S. and Kingsley, J. "Yotti," 2010. Volunteer health and emotional wellbeing in marine protected areas. *Ocean & Coastal Management*, *53* (8), 447–453.

Lawrence, A., 2006. "No Personal Motive?" Volunteers, Biodiversity, and the False Dichotomies of Participation. *Ethics, Place & Environment*, *9* (3), 279–298.

Liao-Troth, M. A. and Dunn, C. P., 1999. Social Constructs and Human Service: Managerial Sensemaking of Volunteer Motivation. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *10* (4), 345–361.

Likert, R., 1932. A technique for the measurement of attitudes. *Archives of Psychology*, *22* (140), 5–55.

LimeSurvey Project Team and Schmitz, C., 2012. LimeSurvey: An Open Source survey tool. Hamburg: LimeSurvey Project. Retrieved from http://www.limesurvey.org/

Lough, B. J., McBride, A. M. and Sherraden, M. S., 2009. *Measuring volunteer outcomes: Development of the international volunteer impacts survey*. (No. 09–31). St. Louis: Washington University.

Lyubomirsky, S., 2001. Why are some people happier than others? The role of cognitive and

motivational processes in well-being. *American Psychologist*, *56* (3), 239–249.

Lyubomirsky, S., King, L. and Diener, E., 2005. The Benefits of Frequent Positive Affect: Does Happiness Lead to Success? *Psychological Bulletin*, *131* (6), 803–855.

MacCallum, R. C., Browne, M. W. and Sugawara, H. M., 1996. Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1* (2), 130–149.

Manfreda, K. L., Bosnjak, M., Berzelak, J., Haas, I. and Vehovar, V., 2008. Web surveys versus other survey modes. *International Journal of Market Research*, *50* (1), 79–104.

Marselle, M. R., Irvine, K. N. and Warber, S. L., 2014. Examining Group Walks in Nature and Multiple Aspects of Well-Being: A Large-Scale Study. *Ecopsychology*, *6* (3), 134–147.

Martin, V., Smith, L., Bowling, A., Christidis, L., Lloyd, D. and Pecl, G., 2016. Citizens as Scientists: What Influences Public Contributions to Marine Research? *Science Communication*, *38* (4), 495–522.

Massung, E., Coyle, D., Cater, K. and Jay, M., 2013. Using crowdsourcing to support pro-environmental community activism. *In*: *CHI '13 Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* 371–380.

Matsunaga, M., 2010. How to Factor-Analyze Your Data Right: Do's, Don'ts, and How-To's. *International Journal of Psychological Research*, *3* (1), 97–110.

McGill University, 2010. PHYLO, DNA Puzzles. McGill University.

McKee, J. R. and McKee, T. W., 2012. *The New Breed: Understanding & Equipping the 21st-century Volunteer*. 2nd edition. USA: Group.

Measham, T. G. and Barnett, G. B., 2008. Environmental Volunteering: motivations, modes and outcomes. *Australian Geographer*, *39* (4), 537–552.

Millette, V. and Gagné, M., 2008. Designing volunteers' tasks to maximize motivation, satisfaction and performance: The impact of job characteristics on volunteer engagement. *Motivation and Emotion*, *32* (1), 11–22.

Moore, M., Townsend, M. and Oldroyd, J., 2006. Linking Human and Ecosystem Health: The Benefits of Community Involvement in Conservation Groups. *EcoHealth*, *3* (4), 255–261.

Morrow-Howell, N., Hong, S. I. and Tang, F., 2009. Who benefits from volunteering? Variations in perceived benefits. *Gerontologist*, *49* (1), 91–102.

Morrow-Howell, N. and Mui, A. C., 1989. Elderly Volunteers: Reasons for initiating and terminating service. *Journal of Gerontological Social Work*, *13* (3–4), 21–34.

Morrow-Howell, N., Tang, F., Hinterlong, J. and Rozario, P. A., 2003. Effects of volunteering on the well-being of older adults. *Journals of Gerontology - Series B Psychological Sciences and Social Sciences*, *58* (3), 137–145.

Muirhead, S., 2011. *Nature and well-being : building social and emotional capital through environmental volunteering*. [online]. Thesis (PhD). University of Dundee.

Musick, M. A. and Wilson, J., 2008. *Volunteers: a social profile*. Bloomington: Indiana University Press.

Natural England, 2015. *Monitor of Engagement with the Natural Environment: Annual Report from the 2013-14 survey*. Peterborough, UK.: Natural England

Newman, G., Wiggins, A., Crall, A., Graham, E., Newman, S. and Crowston, K., 2012. The Future of Citizen Science: Emerging Technologies and Shifting Paradigms. *Frontiers in Ecology and the Environment*, *10* (6), 298–304.

Nunnally, J. C., 1978. *Psychometric theory*. 2nd edition. New York; London: McGraw-Hill.

Nurmi, J.-E., Toivonen, S., Salmela-aro, K. and Eronen, S., 1997. Social Strategies and

Loneliness. *The Journal of Social Psychology*, *137* (6), 764–777.

O'Brien, L., Burls, A., Townsend, M. and Ebden, M., 2011. Volunteering in nature as a way of enabling people to reintegrate into society. *Perspectives in Public Health*, *131* (2), 71–81.

O'Brien, L., Townsend, M. and Ebden, M., 2008. *"I like to think when I"m gone I will have left this a better place'. Environmental volunteering: motivations , barriers and benefits*. Farnham: Scottish Forestry Trust and Forestry Commission.

O'Brien, L., Townsend, M. and Ebden, M., 2010. "Doing Something Positive": Volunteers' Experiences of the Well-Being Benefits Derived from Practical Conservation Activities in Nature. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *21* (4), 525–545.

Ockenden, N., 2007. *Volunteering in the natural outdoors in the UK and Ireland: A literature review*. London: Institute for Volunteering Research.

OECD, 2016. OECD Better Life Index, *Life Satisfaction* [online]. OECD Publishing. Available from: http://www.oecdbetterlifeindex.org/topics/life-satisfaction/ [Accessed 16 August 2016].

Office for National Statistics, 2015. *Personal well-being in the UK, 2014/2015. Statistical Bulletin*. London, UK.

Okun, M. A., Barr, A. and Herzog, A. R., 1998. Motivation to volunteer by older adults: A test of competing measurement models. *Psychology and Aging*, *13* (4), 608–621.

Okun, M. A. and Schultz, A., 2003. Age and motives for volunteering: Testing hypotheses derived from socioemotional selectivity theory. *Psychology and Aging*, *18* (2), 231–239.

Omoto, A. M. and Snyder, M., 1990. Basic research in action: Volunteerism and society's response to AIDS. *Personality and Social Psychology Bulletin*, *16* (1), 152–165.

Onyx, J. and Warburton, J., 2003. Volunteering and health among older people: A review. *Australasian Journal on Ageing*, *22* (2), 65–69.

Payne, S. L., 1971. *The art of asking questions*. Princeton (N.J.) : Princeton University Press, 1951.

Peterson, R. A., 2000. *Constructing effective questionnaires*. Thousand Oaks, Calif.; London: Sage Publications.

Piliavin, J., 2009. Volunteering across the life span: Doing well by doing good. *In*: Stürmer, S., and Snyder, M., eds. *The psychology of prosocial behavior: Group processes, intergroup relations, and helping*. Chichester: Wiley-Blackwell, 157–172.

Piliavin, J. A., 2003. Doing well by doing good: Benefits for the benefactor. *In*: Keyes, C. L. M., and Haidt, J., eds. *Flourishing: Positive psychology and the life well-lived.* Washington, DC US: American Psychological Association, 227–247.

Piliavin, J. A. and Siegl, E., 2007. Health Benefits of Volunteering in the Wisconsin Longitudinal Study. *Journal of Health and Social Behavior*, *48* (4), 450–464.

Pillemer, K., Fuller-Rowell, T., Reid, M. and Wells, N., 2010. Environmental volunteering and health outcomes over a 20-year period. *The Gerontologist*, *50* (5), 594–602.

Pine, B. and Gilmore, J., 1998. Welcome to the experience economy. *Harvard Business Review*, *76* , 97–105.

Pine, B. and Gilmore, J., 1999. *The experience economy: Work is theatre & every business is a stage*. Boston: Harvard Business School Press.

Pine, B. and Gilmore, J., 2011. *The experience economy*. Boston: Harvard Business Review Press.

Pocock, M. J. O., Newson, S. E., Henderson, I. G., Peyton, J., Sutherland, W. J., Noble, D. G., Ball, S. G., Beckmann, B. C., Biggs, J., Brereton, T., Bullock, D. J., Buckland, S. T., Edwards, M.,

Eaton, M. A., Harvey, M. C., Hill, M. O., Horlock, M., Hubble, D. S., Julian, A. M., Mackey, E. C., Mann, D. J., Marshall, M. J., Medlock, J. M., O'Mahony, E. M., Pacheco, M., Porter, K., Prentice, S., Procter, D. A., Roy, H. E., Southway, S. E., Shortall, C. R., Stewart, A. J. A., Wembridge, D. E., Wright, M. A. and Roy, D. B., 2015. Developing and enhancing biodiversity monitoring programmes: a collaborative assessment of priorities. *Journal of Applied Ecology*, *52* (3), 686–695.

Prestopnik, N. and Crowston, K., 2011. Gaming for (citizen) science: exploring motivation and data quality in the context of crowdsourced science through the design and evaluation of a social-computational system. *In*: *e-Science Workshops (eScienceW), 2011 IEEE Seventh International Conference*. IEEE. 28–33.

Pretty, J., Peacock, J., Sellens, M. and Griffin, M., 2005. The mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research*, *15* (5), 319–337.

Pushkar, D., Reis, M. and Morros, M., 2002. Motivation, personality and well-being in older volunteers. *International Journal of Aging & Human Development*, *55* (2), 141–62.

Raddick, M. and Bracey, G., 2009. *Citizen science: status and research directions for the coming decade*. *Astro2010: The Astronomy and Astrophysics Decadal Survey, Position Papers, no. 46*

Raddick, M. J., Bracey, G., Gay, P. L., Lintott, C. J., Cardamone, C., Murray, P., Schawinski, K., Szalay, A. S. and Vandenberg, J., 2013. Galaxy Zoo: Motivations of Citizen Scientists. *Astronomy Education Review*, *12* (1), 1–27.

Raddick, M. J., Bracey, G., Gay, P. L., Lintott, C. J., Murray, P., Schawinski, K., Szalay, A. S. and Vandenberg, J., 2010. Galaxy Zoo: Exploring the Motivations of Citizen Science Volunteers. *Astronomy Education Review*, *9* (1), 10103–10118.

Raiche, G., 2010. nFactors: an R package for parallel analysis and non graphical solutions to the Cattell scree test [R package version 2.3.3]. Retrieved from https://cran.r-project.org/package=nFactors.

Rannap, R., 2004. Boreal Baltic coastal meadow management for Bufo calamita. *In*: *Coastal meadow management - best practice guidelines*. Tallinn: Ministry of the Environment of the Republic of Estonia, 26–33.

Rattan, J. K., Eagles, P. F. J. and Mair, H. L., 2012. Volunteer tourism: Its role in creating conservation awareness. *Journal of Ecotourism*, *11* (1), 1–15.

Reidy, M., Chevalier, W. and McDonald, T., 2005. Lane Cove National Park Bushcare volunteers: Taking stock, 10 years on. *Ecological Management and Restoration*, *6* (2), 94–104.

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J. and Ryan, R. M., 2000. Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin*, *26* (4), 419–435.

Revelle, W., 2016. psych: Procedures for Personality and Psychological Research. Evanston, Illinois, USA: Northwestern University. Retrieved from http://cran.r-project.org/package=psych.

Roggenbuck, J., Haas, S., Hall, T. and Hull, R., 2001. *Motivation, Retention, and Program Recommendations of Save Our Stream Volunteers*. Blacksburg: Virginia Water Resources Research Center.

Rosseel, Y., 2012. lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48* (2), 1–36.

Rotman, D., Hammock, J., Preece, J., Hansen, D., Boston, C., Bowser, A. and He, Y., 2014. Motivations affecting initial and long-term participation in citizen science projects in three countries. *iConference 2014 Proceedings*, 110–124.

Rotman, D., Preece, J., Hammock, J., Procita, K., Hansen, D., Parr, C., Lewis, D. and Jacobs, D., 2012. Dynamic changes in motivation in collaborative citizen-science projects. *In*: *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work - CSCW '12*. New York, New York, USA: ACM Press. 217.

Roy, H. E., Pocock, M. J. O., Preston, C. D., Roy, D. B., Savage, J., Tweddle, J. C. and Robinson, L. D., 2012. *Understanding Citizen Science & Environmental Monitoring. Final Report on behalf of UK-EOF*. London, UK: NERC Centre for Ecology & Hydrology and Natural History Museum.

RStudio Team, 2015. RStudio: Integrated Development for R. Boston, MA: RStudio, Inc. Retrieved from www.rstudio.com.

Ryan, R. L., Kaplan, R. and Grese, R. E., 2001. Predicting Volunteer Commitment in Environmental Stewardship Programmes. *Journal of Environmental Planning & Management*, *44* (5), 629–648.

Ryan, R. M. and Deci, E. L., 2001. On happiness and human potentials: a review of research on hedonic and eudaimonic well-being. *Annual Review Of Psychology*, *52* , 141–166.

Ryff, C. D., 1989. Happiness Is Everything, or Is It? Explorations on the Meaning of Psychological Well-Being. *Journal of Personality & Social Psychology*, *57* (6), 1069–1081.

Ryff, C. D., 1995. Psychological Well-Being in Adult Life. *Current Directions in Psychological Science*, *4* (4), 99–104.

Ryff, C. D., 2014. Psychological Well-Being Revisited: Advances in the Science and Practice of Eudaimonia. *Psychotherapy and Psychosomatics*, *83* (1), 10–28.

Salamon, L. M., Sokolowski, S. W. and Haddock, M. A., 2011. Measuring the economic value of volunteer work globally: concepts, estimates, and a roadmap to the future. *Annals of Public and Cooperative Economics*, *82* (3), 217–252.

Schkade, D. and Kahneman, D., 1998. Does living in California make people happy? A focusing illusion in judgments of life satisfaction. *Psychological Science*, *9* (5), 340–346.

Schmeller, D. S., Henry, P.-Y., Julliard, R., Gruber, B., Clobert, J., Dziock, F., Lengyel, S., Nowicki, P., Déri, E., Budrys, E., Kull, T., Tali, K., Bauch, B., Settele, J., Van Swaay, C., Kobler, A., Babij, V., Papastergiadou, E. and Henle, K., 2009. Advantages of volunteer-based biodiversity monitoring in Europe. *Conservation Biology : The Journal of the Society for Conservation Biology*, *23* (2), 307–16.

Schneider, L. and Schimmack, U., 2009. Self-Informant Agreement in Well-Being Ratings: A Meta-Analysis. *Social Indicators Research*, *94* (3), 363–376.

Schnell, R., Bachteler, T. and Reiher, J., 2010. Improving the use of self-generated identification codes. *Evaluation Review*, *34* (5), 391–418.

Scyphers, S. B., Powers, S. P., Akins, J. L., Drymon, J. M., Martin, C. W., Schobernd, Z. H., Schofield, P. J., Shipp, R. L. and Switzer, T. S., 2014. The Role of Citizens in Detecting and Responding to a Rapid Marine Invasion. *Conservation Letters*, 1–9.

Seligman, M. E. P., 2011. *Flourish: A New Understanding of Happiness and Well-Being - and How To Achieve Them*. London: Nicholas Brealey Publishing.

Shirk, J. L., Ballard, H. L., Wilderman, C. C., Phillips, T., Wiggins, A., Jordan, R., McCallie, E., Minarchek, M., Lewenstein, B. V, Krasny, M. E. and Bonney, R., 2012. Public participation in scientific research: a framework for deliberate design. *Ecology And Society*, *17* (2), 29.

Silvertown, J., 2009. A new dawn for citizen science. *Trends in Ecology & Evolution*, *24* (9), 467–471.

Smith, D. H., 1981. Altruism, Volunteers, and Volunteerism. *Nonprofit and Voluntary Sector Quarterly* , *10* (1), 21–36.

Smith, J. D., 2000. Volunteering and social development. *Voluntary Action*, *3* (1)

Smith, J. D., Gaskin, K., Ellis, A. and Howlett, S., 2015. *Volunteering impact assessment toolkit*. London, UK: ncvo.

Snyder, M. and Omoto, A. M., 2008. Volunteerism: Social issues perspectives and social policy implications. *Social Issues and Policy Review*, *2* (1), 1–36.

Son, J. and Wilson, J., 2012. Volunteer Work and Hedonic, Eudemonic, and Social Well-Being. *Sociological Forum*, *27* (3), 658–681.

Sparks, T. H. and Carey, P. D., 1995. The Responses of Species to Climate Over Two Centuries: An Analysis of the Marsham Phenological Record, 1736-1947. *Journal of Ecology*, *83* (2), 321–329.

Stamboulis, Y. and Skayannis, P., 2003. Innovation strategies and technology for experience-based tourism. *Tourism Management*, *24* (1), 35–43.

Stone, A., Shiffman, S. and DeVries, M., 1999. Ecological momentary assessment. *In*: Kahneman, D.,, Diener, E., and Schwarz, N., eds. *Well-being: The foundations of hedonic psychology*. New York: Russell Sage Foundation, 26–39.

Stukas, A. A., Daly, M. and Cowling, M., 2005. Volunteerism and social capital: A functional approach. *Australian Journal on Volunteering*, *10* (2), 35–44.

Stukas, A. A., Hoye, R., Nicholson, M., Brown, K. M. and Aisbett, L., 2016.a Motivations to Volunteer and Their Associations With Volunteers' Well-Being. *Nonprofit and Voluntary Sector Quarterly*, *45* (1), 112–132.

Stukas, A. A., Snyder, M. and Clary, E. G., 1999. The Effects of "Mandatory Volunteerism" on Intentions to Volunteer. *Psychological Science*, *10* (1), 59–64.

Stukas, A. A., Snyder, M. and Clary, E. G., 2014. Volunteerism and Community Involvement: Antecedents, Experiences, and Consequences for the Person and the Situation. *In*: Schroeder, D. A., and Graziano, W., eds. *The Oxford Handbook of Prosocial Behavior*. New York: Oxford University Press.

Stukas, A. A., Snyder, M. and Clary, E. G., 2016.b Understanding and encouraging volunteerism and community involvement. *The Journal of Social Psychology*, *156* (3), 243–255.

Stukas, A. A., Worth, K. A., Clary, E. G. and Snyder, M., 2009. The Matching of Motivations to Affordances in the Volunteer Environment: An Index for Assessing the Impact of Multiple Matches on Volunteer Outcomes. *Nonprofit and Voluntary Sector Quarterly*, *38* (1), 5–28.

Suding, K. N., 2011. Toward an Era of Restoration in Ecology: Successes, Failures, and Opportunities Ahead. *Annual Review of Ecology, Evolution, and Systematics*, *42* (1), 465–487.

Sullivan, B. L., Phillips, T., Dayer, A. A., Wood, C. L., Farnsworth, A., Iliff, M. J., Davies, I. J., Wiggins, A., Fink, D., Hochachka, W. M., Rodewald, A. D., Rosenberg, K. V., Bonney, R. and Kelling, S., 2016. Using open access observational data for conservation action: A case study for birds. *Biological Conservation*

Sundbo, J. and Sørensen, F., 2013. *Handbook on the experience economy*. Cheltenham: Edward Elgar Publishing Limited.

Tabachnick, B. G. and Fidell, L. S., 1996. *Using multivariate statistics*. 3rd edition. New York: HarperCollins College Publishers.

The Conservation Volunteers, 2014. *Volunteering Impacts*. Doncaster, UK: The Conservation Volunteers.

The RSPB, 2015. Big Garden Birdwatch, Sandy, Available from: https://www.rspb.org.uk/birdwatch [Accessed 26 January 2015].

Thiel, M., Penna-Diaz, M. A., Luna-Jorquera, G., Salas, S., Sellanes, J. and Stotz, W., 2014. Citizen scientists and marine research: volunteer participants, their contributions, and projection for the future. *Oceanography and Marine Biology: An Annual Review*, *52* , 257–314.

Thoits, P. A. and Hewitt, L. N., 2001. Volunteer work and well-being. *Journal Of Health And Social Behavior*, *42* (2), 115–131.

Tian, H., Stige, L. C., Cazelles, B., Kausrud, K. L., Svarverud, R., Stenseth, N. C. and Zhang, Z., 2011. Reconstruction of a 1,910-y-long locust series reveals consistent associations with climate fluctuations in China. *Proceedings of the National Academy of Sciences of the United States of America*, *108* (35), 14521–6.

Toepoel, V., Das, M. and Van Soest, A., 2009. Design of web questionnaires: The effects of the number of items per screen. *Field Methods*, *21* (2), 201–213.

Tourangeau, R., Rips, L. and Rasinski, K., 2000. *The psychology of survey response*. Cambridge: Cambridge University Press.

Townsend, M., 2006. Feel blue? Touch green! Participation in forest/woodland management as a treatment for depression. *Urban Forestry & Urban Greening*, *5* (3), 111–120.

Tschirhart, M., Mesch, D. J., Perry, J. L., Miller, T. K. and Lee, G., 2001. Stipended Volunteers: Their Goals, Experiences, Satisfaction, and Likelihood of Future Service. *Nonprofit and Voluntary Sector Quarterly*, *30* (3), 422–443.

Tulloch, A. I. T., Possingham, H. P., Joseph, L. N., Szabo, J. and Martin, T. G., 2013. Realising the full potential of citizen science monitoring programs. *Biological Conservation*, *165* , 128–138.

Turner, C. F., 1984. Why do surveys disagree? Some preliminary hypotheses and some disagreeable examples. *In*: Turner, C. F., and Martin, E., eds. *Surveying subjective phenomena 2*. New York: Russell Sage Foundation, 159–214.

Tweddle, J. C., Robinson, L. D., Pocock, M. J. O. and Roy, H. E., 2012. *Guide to citizen science: developing, implementing and evaluating citizen science to study biodiversity and the environment in the UK*. Natural History Museum and NERC Centre for Ecology and Hydrology for UK-EOF.

UN, 2001. *Commission for Social Development. Report on the thirty-ninth session. E/2001/26. E/CN.5/2001/9*. New York: UN.

Unger, L. S., 1991. Altruism as a motivation to volunteer. *Journal of Economic Psychology*, *12* (1), 71–100.

Van Willigen, M., 2000. Differential benefits of volunteering across the life course. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences*, *55* (5), s308–S318.

Velicer, W., 1976. Determining the number of components from the matrix of partial correlations. *Psychometrika*, *41* (3), 321–327.

Wahl, V., 2010. *Why people help: Motivations and barriers for stewardship volunteering*. [online]. Thesis (PhD). The University of British Columbia

Weinstein, N. and Ryan, R., 2010. When helping helps: autonomous motivation for prosocial behavior and its influence on well-being for the helper and recipient. *Journal of Personality and Social Psychology*, *98* (2), 222–244.

Weng, Y.-C., 2015. Contrasting visions of science in ecological restoration: Expert-lay dynamics between professional practitioners and volunteers. *Geoforum*, *65* , 134–145.

Weston, M., Silcocks, A., Tzaros, C. and Ingwersen, D., 2006. A survey of contributors to an Australian bird atlassing project: demography, skills and motivation. *Australian Journal on Volunteering*, *11* (2), 51–58.

Wheeler, J. A., Gorey, K. M. and Greenblatt, B., 1998. The beneficial effects of volunteering for older volunteers and the people they serve: A meta-analysis. *International Journal of Aging and Human Development*, *47* (1), 69–79.

Wickham, H., 2009. ggplot2: Elegant Graphics for Data Analysis. New York, USA: Springer-Verlag. Retrieved from http://ggplot2.org

Wilson, A. L. G., Hoge, C. W., McGurk, D., Thomas, J. L., Clark, J. C. and Castro, C. A., 2010. Application of a new method for linking anonymous survey data in a population of soldiers returning from Iraq. *Annals of Epidemiology*, *20* (12), 931–8.

Wilson, J., 2000. Volunteering. *Annual Review of Sociology*, *26* , 215–240.

Wilson, J., 2012. Volunteerism Research: A Review Essay. *Nonprofit and Voluntary Sector Quarterly*, *41* (2), 176–212.

Windsor, T. D., Anstey, K. J. and Rodgers, B., 2008. Volunteering and Psychological Well-Being Among Young-Old Adults: How Much Is Too Much? *The Gerontologist*, *48* (1), 59–70.

Wright, D. R., Underhill, L. G., Keene, M. and Knight, A. T., 2015. Understanding the Motivations and Satisfactions of Volunteers to Improve the Effectiveness of Citizen Science Programs. *Society & Natural Resources*, *28* (9), 1013–1029.

Wright, T. and Staw, B., 1999. Affect and favorable work outcomes: Two longitudinal tests of the happy-productive worker thesis. *Journal of Organizational Behavior*, *20* (1), 1–23.

Wyles, K. J., Pahl, S., Holland, M. and Thompson, R. C., 2016. Can Beach Cleans Do More Than Clean-Up Litter? Comparing Beach Cleans to Other Coastal Activities. *Environment and Behavior*, 1–27.

Yan, T., Conrad, F. G., Tourangeau, R. and Couper, M. P., 2011. Should I Stay or Should I go: The Effects of Progress Feedback, Promised Task Duration, and Length of Questionnaire on Completing Web Surveys. *International Journal of Public Opinion Research*, *23* (2), 131–147.

Yerrell, P., 2008. *National Evaluation of TCV's Green Gym, Report No. 29*. Oxford: Oxford Brookes University

Yeung, A. B., 2004. The Octagon Model of Volunteer Motivation: Results of a Phenomenological Analysis. *Voluntas: International Journal of Voluntary & Nonprofit Organizations*, *15* (1), 21–46.

Yurek, L. A., Vasey, J. and Sullivan Havens, D., 2008. The use of self-generated identification codes in longitudinal research. *Evaluation Review*, *32* (5), 435–52.

Appendices

Appendix I - Example participant information sheet for volunteers (study 1)

Faculty of Science & Technology
Bournemouth University
Poole
BH12 5BB

Bournemouth University

Participant Information Sheet for Well-being Survey

Study focusing on enhancing human well-being and wildlife conservation through volunteer engagement

Who are we and why are we contacting you?
You are being invited to take part in a research project looking at volunteer well-being. Before you decide to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

What is the purpose of the project?
The aim of this study is to find out how the volunteer experience influences the well-being of volunteers when they participate in volunteering activities.

Why have I been chosen and what are we asking you to do?
We are asking you to take part in this study as you are volunteering with an environmental project or organisation. We would like you to fill out the attached survey. It will take 5-10 minutes of your time. At the end of your volunteering experience today, we ask you to fill out another survey. It will also take about 5-10 minutes of your time.

Will my taking part in this project be kept confidential?
All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any reports or publications.

What will happen to the results of the research study?
We will use what we learn from you to determine how volunteering might have an effect on the well-being of volunteers. This research is part of a 3-year PhD project.

The information will help us to advise organisations working with volunteers about how better to motivate and engage their volunteers, ultimately leading to increased well-being of the volunteers and increased benefits to the organisation and the environment.

Who is organising the research?
The study is being funded and conducted by Bournemouth University. If you have any concerns about the conduct of this study, please contact Dr. Rick Stafford on 01202 966780 or rstafford@bournemouth.ac.uk

Do I have to take part?
It is entirely up to you whether or not you take part and you can withdraw at any time without giving a reason. If you would like to ask some questions before deciding whether to take part please do speak to us.

Contact for further information
Gitte Kragh
PhD student
Faculty of Science & Technology
Bournemouth University, Poole, BH12 5BB
Email: gitte.kragh@bournemouth.ac.uk
Tel: 07922 876 848

Thank you for reading this information

Appendix II - Volunteer Functions Inventory (VFI)

1. Volunteering can help me to get my foot in the door at a place where I would like to work.	1	2	3	4	5	6	7
2. My friends volunteer.	1	2	3	4	5	6	7
3. I am concerned about those less fortunate than myself.	1	2	3	4	5	6	7
4. People I'm close to want me to volunteer.	1	2	3	4	5	6	7
5. Volunteering makes me feel important.	1	2	3	4	5	6	7
6. People I know share an interest in community service.	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
7. No matter how bad I've been feeling, volunteering helps me to forget about it.	1	2	3	4	5	6	7
8. I am genuinely concerned about the particular group I am serving.	1	2	3	4	5	6	7
9. By volunteering I feel less lonely.	1	2	3	4	5	6	7
10. I can make new contacts that might help my business or career.	1	2	3	4	5	6	7
11. Doing volunteer work relieves me of some of the guilt over being more fortunate than others.	1	2	3	4	5	6	7
12. I can learn more about the cause for which I am working.	1	2	3	4	5	6	7
13. Volunteering increases my self-esteem.	1	2	3	4	5	6	7
14. Volunteering allows me to gain a new perspective on things.	1	2	3	4	5	6	7
15. Volunteering allows me to explore different career options.	1	2	3	4	5	6	7
16. I feel compassion toward people in need.	1	2	3	4	5	6	7
17. Others with whom I am close place a high value on community service.	1	2	3	4	5	6	7
18. Volunteering lets me learn things through direct, hands on experience.	1	2	3	4	5	6	7
19. I feel it is important to help others.	1	2	3	4	5	6	7
20. Volunteering helps me work through by own personal problems.	1	2	3	4	5	6	7
21. Volunteering will help me to succeed in my chosen profession.	1	2	3	4	5	6	7
22. I can do something for a cause that is important to me.	1	2	3	4	5	6	7
23. Volunteering is an important activity to the people I know best.	1	2	3	4	5	6	7
24. Volunteering is a good escape from my own troubles.	1	2	3	4	5	6	7
25. I can learn how to deal with a variety of people.	1	2	3	4	5	6	7
26. Volunteering makes me feel needed.	1	2	3	4	5	6	7
27: Volunteering makes me feel better about myself.	1	2	3	4	5	6	7
28. Volunteering experience will look good on my rrsum&	1	2	3	4	5	6	7
29. Volunteering is a way to make new friends.	1	2	3	4	5	6	7
30. I can explore my own strengths.	1	2	3	4	5	6	7

Scoring:
Items 7, 9, 11, 20, 24 make up the Protective factor.
Items 3, 8, 16, 19, 22 make up the Values factor.
Items 1, 10, 15, 21, 28 make up the Career factor.
Items 2, 4, 6, 17, 23 make up the Social factor.
Items 12, 14, 18, 25, 30 make up the Understanding factor
Items 5, 13, 26, 27, 29 make up the Enhancement factor.
Scoring is kept at the factor level and kept continuous.

Self Report Measures for Love and Compassion Research: *Helping Others*

Fetzer Institute

(Clary et al. 1998)

Appendix III - The PERMA Profiler (PERMA-P)

Updated 08/06/13 - PK

The PERMA Profiler
Julie Butler & Margaret L. Kern, University of Pennsylvania

#	Question	Response Anchors	Label	Notes
1	In general, to what extent do you lead a purposeful and meaningful life?	0 = not at all, 10 = completely	**M1**	
2	How lonely do you feel in your daily life?	0 = not at all, 10 = completely	**Lonely**	Single item, not reported
3	How much of the time do you feel you are making progress towards accomplishing your goals?	0 = never, 10 = always	**A1**	
4	In general, how often do you feel anxious	0 = never, 10 = always	**N1**	
5	How often do you become absorbed in what you are doing?	0 = never, 10 = always	**E1**	
6	In general, how would you say your health is?	0 = terrible, 10 = excellent	**Health1**	Not reported
7	In general, how often do you feel joyful?	0 = never, 10 = always	**P1**	
8	To what extent do you receive help and support from others when you need it?	0 = not at all, 10 = completely	**R1**	
9	In general, how often do you feel angry?	0 = never, 10 = always	**N2**	
10	How often do you achieve the important goals you have set for yourself?	0 = never, 10 = always	**A2**	
11	In general, to what extent do you feel that what you do in your life is valuable and worthwhile?	0 = not at all, 10 = completely	**M2**	
12	In general, how often do you feel positive?	0 = never, 10 = always	**P2**	
13	In general, to what extent do you feel excited and interested in things?	0 = not at all, 10 = completely	**E2**	
14	To what extent have you been feeling loved?	0 = not at all, 10 = completely	**R2**	
15	How satisfied are you with your current physical health?	0 = not at all, 10 = completely	**Health2**	Not reported
16	In general, how often do you feel sad?	0 = never, 10 = always	**N3**	
17	How often are you able to handle your responsibilities?	0 = never, 10 = always	**A3**	
18	To what extent do you generally feel you have a sense of direction in your life?	0 = not at all, 10 = completely	**M3**	
19	Compared to others of your same age and sex, how is your health?	0 = terrible, 10 = excellent	**Health3**	Not reported
20	How satisfied are you with your personal relationships?	0 = not at all, 10 = completely	**R3**	
21	How often do you lose track of time while doing something you enjoy?	0 = never, 10 = always	**E3**	
22	In general, to what extent do you feel contented?	0 = not at all, 10 = completely	**P3**	
23	Taking all things together, how happy would you say you are?	0 = not at all, 10 = completely	**happy**	Combine with PERMA items

Updated 08/06/13 - PK

The PERMA Profiler

Julie Butler & Margaret L. Kern, University of Pennsylvania

Question Presentation:

Radial buttons with only anchors labeled. For example:

	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
In general, to what extent do you feel contented?	○	○	○	○	○	○	○	○	○	○	○

Scoring:

P = mean(P1,P2,P3)

E = mean(E1,E2,E3)

R = mean(R1,R2,R3)

M = mean(M1,M2,M3)

A = mean(A1,A2,A3)

Overall = mean(P1,P2,P3,E1,E2,E3, R1,R2,R3, M1,M2,M3, A1,A2,A3,happy)

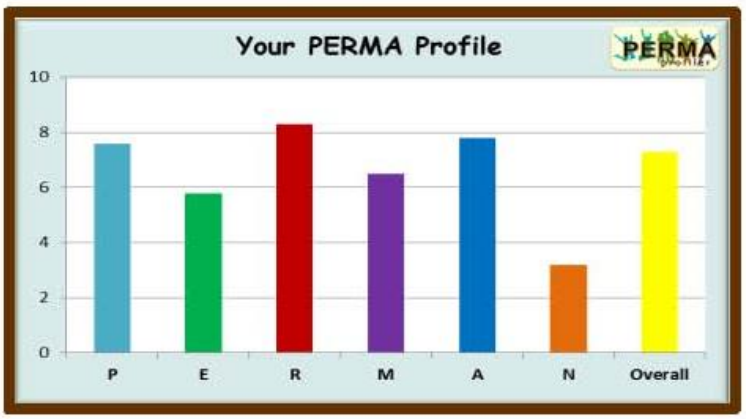
N = mean(N1,N2,N3)

Health = mean(health1,health2,health3)

Lonely = single item

Scoring presentation

Profile of PERMA, overall, and N. For example:



(Butler and Kern 2016)

Appendix IV - Onsite volunteer survey (study 1), before and after volunteering questionnaires

Bournemouth University

Volunteer Well-being Questionnaire (start-of-day) for PhD project:
Enhancing human well-being and wildlife conservation
through volunteer engagement
(Please see attached participant information sheet for additional information)

Consent

By completing this questionnaire, I confirm that:

a. I have read and understood the participant information sheet for the above research project and have had the opportunity to ask questions
b. I understand that my participation is voluntary and anonymous and that I am free to withdraw at any time until the data are aggregated and analysed, without giving reason. In addition, should I not wish to answer any particular question(s), I am free to decline
c. I give permission for members of the research team to have access to my anonymised responses
d. I agree to take part in the above research project

Name, position and contact details of researcher:	**Name, position and contact details of supervisor:**
Gitte Kragh, PhD student, gitte.kragh@bournemouth.ac.uk	Anita Diaz, Senior Lecturer, adiaz@bournemouth.ac.uk

1. Thinking about your volunteer activities today, how motivated are you about your volunteering today on a scale from 1 (not at all motivated) to 7 (extremely motivated)?

1 (not at all motivated)	2	3	4	5	6	7 (extremely motivated)
☐	☐	☐	☐	☐	☐	☐

---

2. Please make a code by taking:

The first 3 letters of the place you were born	*e.g. London -> write*	***LON***
The number representing the month you were born	*e.g. January -> write*	***01***
The first initial of your mother's first name	*e.g. Mother's name: Ann -> write*	***A***
	In above example the code is:	***LON01A***

Your code:

(You will be asked about this code for the afternoon questionnaire again so results can be compared)

Please turn over

1

3. Please rate the following statements on a scale from 0 to 10

Overall...	**Not at all 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Comple-tely10**
How satisfied are you with your life at present?	□	□	□	□	□	□	□	□	□	□	□

In general...	**Never 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Always 10**
How much of the time do you feel you are making progress towards accomplishing your goals?	□	□	□	□	□	□	□	□	□	□	□
How often do you become absorbed in what you are doing?	□	□	□	□	□	□	□	□	□	□	□
How often do you feel joyful?	□	□	□	□	□	□	□	□	□	□	□
How often do you feel anxious?	□	□	□	□	□	□	□	□	□	□	□
How often do you achieve the important goals you have set for yourself?	□	□	□	□	□	□	□	□	□	□	□

In general...	**Terrible 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Excellent 10**
How would you say your health is?	□	□	□	□	□	□	□	□	□	□	□

In general...	**Not at all 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Completely 10**
To what extent do you lead a purposeful and meaningful life?	□	□	□	□	□	□	□	□	□	□	□
To what extent do you receive help and support from others when you need it?	□	□	□	□	□	□	□	□	□	□	□
To what extent do you feel that what you do in your life is valuable and worthwhile?	□	□	□	□	□	□	□	□	□	□	□
To what extent do you feel excited and interested in things?	□	□	□	□	□	□	□	□	□	□	□
How lonely do you feel in your daily life?	□	□	□	□	□	□	□	□	□	□	□

3 (continued). Please rate the following statements on a scale from 0 to 10

	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
How satisfied are you with your current physical health?	□	□	□	□	□	□	□	□	□	□	□

In general...	Never 0	1	2	3	4	5	6	7	8	9	Always 10
How often do you feel positive?	□	□	□	□	□	□	□	□	□	□	□
How often do you feel frustrated?	□	□	□	□	□	□	□	□	□	□	□
How often are you able to handle your responsibilities?	□	□	□	□	□	□	□	□	□	□	□
How often do you feel sad?	□	□	□	□	□	□	□	□	□	□	□
How often do you lose track of time while doing something you enjoy?	□	□	□	□	□	□	□	□	□	□	□

	Terrible 0	1	2	3	4	5	6	7	8	9	Excellent 10
Compared to others of your same age and sex, how is your health?	□	□	□	□	□	□	□	□	□	□	□

In general...	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
To what extent do you generally feel you have a sense of direction in your life?	□	□	□	□	□	□	□	□	□	□	□
How satisfied are you with your personal relationships?	□	□	□	□	□	□	□	□	□	□	□
To what extent do you feel appreciated?	□	□	□	□	□	□	□	□	□	□	□
To what extent do you feel contented?	□	□	□	□	□	□	□	□	□	□	□

	Not at all	1	2	3	4	5	6	7	8	9	Completely
Taking all things together, how happy would you say you are?	□	□	□	□	□	□	□	□	□	□	□

Please turn over

4. How often do you volunteer with this organisation/project?	
Several times a week	☐
Once a week	☐
Once or twice a month	☐
Once every 2-3 months	☐
Once or twice a year	☐

5. How many hours do you volunteer per month with this organisation/project?	_____ hours

6. How many years have you volunteered with this organisation/project?	_____ years

---

7. How long do you intend to keep volunteering with this organisation/project for?	
Less than a year	☐
1-2 years	☐
3-4 years	☐
5-9 years	☐
10 years or more	☐

---

8. How often do you volunteer with other similar organisations/projects with similar tasks	
Several times a week	☐
Once a week	☐
Once or twice a month	☐
Once every 2-3 months	☐
Once or twice a year	☐
Never (go to conservation question page)	☐

9. How many hours do you volunteer per month with other similar organisations/projects with similar tasks	_____ hours

10. How many years have you volunteered with other similar organisations/projects with similar tasks	_____ years

Please go to conservation question page and fill in the morning part

Researcher use only	B. Volunteering type:
A. Date: _____	☐ Monitoring
	☐ Conservation tasks
C. Data entered: ____	☐ Other: _____

4

Bournemouth University

Volunteer Well-being Questionnaire (end-of-day) for PhD project:
Enhancing human well-being and wildlife conservation
through volunteer engagement
(Please see attached participant information sheet for additional information)

Consent

By completing this questionnaire, I confirm that:

a. I have read and understood the participant information sheet for the above research project and have had the opportunity to ask questions
b. I understand that my participation is voluntary and anonymous and that I am free to withdraw at any time until the data are aggregated and analysed, without giving reason. In addition, should I not wish to answer any particular question(s), I am free to decline
c. I give permission for members of the research team to have access to my anonymised responses
d. I agree to take part in the above research project

Name, position and contact details of researcher:

Gitte Kragh, PhD student, gitte.kragh@bournemouth.ac.uk

Name, position and contact details of supervisor:

Anita Diaz, Senior Lecturer, adiaz@bournemouth.ac.uk

1. In general, how motivated are you about your volunteering on a scale from 1 (not at all motivated) to 7 (extremely motivated)?

1 (not at all motivated)	2	3	4	5	6	7 (extremely motivated)
☐	☐	☐	☐	☐	☐	☐

2. How many hours did you volunteer today: _ _ _ _ _ _ _

3. Please make a code by taking:

The first 3 letters of the place you were born	*e.g. London -> write*	***LON***
The number representing the month you were born	*e.g. January -> write*	***01***
The first initial of your mother's first name	*e.g. Mother's name: Ann -> write*	***A***
	In above example the code is:	***LON01A***

Your code:

_ _

(Same code as this morning)

Please turn over

4. Please rate the following statements on a scale from 0 to 10

Overall...	**Not at all 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Completely 10**
How satisfied are you with your volunteering experience today?	□	□	□	□	□	□	□	□	□	□	□

	Never 0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Always 10**
How much of the time did you feel you were making progress towards accomplishing your goals volunteering today?	□	□	□	□	□	□	□	□	□	□	□
To what extent did you become absorbed in your volunteering tasks today?	□	□	□	□	□	□	□	□	□	□	□
How much of the time did you feel joyful during volunteering today?	□	□	□	□	□	□	□	□	□	□	□
How much of the time did you feel anxious during your volunteering today?	□	□	□	□	□	□	□	□	□	□	□

	Terrible 0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Excellent 10**
How would you say your health is right now after volunteering?	□	□	□	□	□	□	□	□	□	□	□

	Not at all 0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Completely 10**
To what extent did you achieve the important goals you had set for your-self during your volunteering today?	□	□	□	□	□	□	□	□	□	□	□
To what extent did you find your volunteering today purposeful and meaningful?	□	□	□	□	□	□	□	□	□	□	□
To what extent did you receive help and support from others when you needed it during your volunteering today?	□	□	□	□	□	□	□	□	□	□	□
To what extent did you feel that what you did during your volunteering today was valuable and worthwhile?	□	□	□	□	□	□	□	□	□	□	□
To what extent did you feel excited and interested in things during your volunteering today?	□	□	□	□	□	□	□	□	□	□	□
How lonely did you feel during your volunteering today?	□	□	□	□	□	□	□	□	□	□	□

4 (continued). Please rate the following statements on a scale from 0 to 10

	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
How satisfied are you with your physical health right now after having volunteered?	□	□	□	□	□	□	□	□	□	□	□

	Never 0	1	2	3	4	5	6	7	8	9	Always 10
How much of the time did you feel positive during volunteering today?	□	□	□	□	□	□	□	□	□	□	□
How much of the time did you feel frustrated during volunteering today?	□	□	□	□	□	□	□	□	□	□	□
During your volunteering today, how often were you able to handle your responsibilities?	□	□	□	□	□	□	□	□	□	□	□
How much of the time did you feel sad during volunteering today?	□	□	□	□	□	□	□	□	□	□	□
To what extent did you lose track of time during volunteering today?	□	□	□	□	□	□	□	□	□	□	□

	Terrible 0	1	2	3	4	5	6	7	8	9	Excellent 10
Compared to others of your same age and sex, how is your health right now after volunteering?	□	□	□	□	□	□	□	□	□	□	□

	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
To what extent do you feel you have a sense of direction in your volunteering?	□	□	□	□	□	□	□	□	□	□	□
How satisfied were you with your interactions with other people during volunteering today?	□	□	□	□	□	□	□	□	□	□	□
To what extent have you been feeling appreciated during your volunteering today?	□	□	□	□	□	□	□	□	□	□	□
To what extent do you feel contented right now after having volunteered?	□	□	□	□	□	□	□	□	□	□	□

	Not at all 0	1	2	3	4	5	6	7	8	9	Completely 10
How happy are you right now after volunteering?	□	□	□	□	□	□	□	□	□	□	□

Please turn over

7

Please write any comments you have about this questionnaire and the questions:

Please write any comments you have about what well-being means to you:

Please return to your team leader or Gitte

Thank you for your help!

Researcher use only

A. Date: _____

C. Data entered: ____

B. Volunteering type:

☐ Monitoring

☐ Conservation tasks

☐ Other: _____

8

1. Please make a code by taking:

The first 3 letters of the place you were born (*e.g. London = **LON***)

The number representing the month you were born (*e.g. January = **01***)

The first initial of your mother's first name (*e.g. Mother's name: Ann = **A***)

(In the example the code is: ***LON01A****)*

Your code: _____

(The code is used to link the different questionnaires)

2. Please list the conservation <u>tasks</u> for your volunteering today, being as specific as you can *(e.g. collection of records, collect records for certain species, planting X number of trees, clearing a certain area of invasive species, etc.):*	**<u>MORNING</u>** **3. Please indicate how important you think each task is for conservation on a scale from 1 (not at all important) to 7 (extremely important):**							**<u>AFTERNOON</u>** **4. Please indicate how well the conservation tasks set for today's activity were reached on a scale from 1 (not at all achieved) to 7 (completely achieved).**						
Please write conservation tasks for volunteer activity today *(fill in as many as are relevant. You can add more at the end of the day if you did conservation tasks that were not planned from the beginning):*	**1 (not at all)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely)**	**1 (not at all)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely)**
Conservation task 1:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 2:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 3:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 4:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 5:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Appendix V – Onsite volunteer manager survey (Study 1)

Bournemouth University

Volunteer Manager Questionnaire (for volunteer well-being survey days) for PhD project:
Enhancing human well-being and wildlife conservation through volunteer engagement
(Please see attached participant information sheet for additional information)

Consent

By completing this questionnaire, I confirm that:

a. I have read and understood the participant information sheet for the above research project and have had the opportunity to ask questions
b. I understand that my participation is voluntary and anonymous and that I am free to withdraw at any time until the data are aggregated and analysed, without giving reason. In addition, should I not wish to answer any particular question(s), I am free to decline
c. I give permission for members of the research team to have access to my anonymised responses
d. I agree to take part in the above research project

Name, position and contact details of researcher:

Gitte Kragh, PhD student, gitte.kragh@bournemouth.ac.uk

Name, position and contact details of supervisor:

Anita Diaz, Senior Lecturer, adiaz@bournemouth.ac.uk

QUESTIONS FOR THE AFTERNOON (please turn over for morning questions)

4. How many years have you been working or volunteering as a volunteer manager in your current role, or in a similar role?

_____ years

5. How many volunteers were in your group today? _____

6. Please make a code by taking:

The first 3 letters of the place you were born	*e.g. London = **LON***
The number representing the month you were born	*e.g. January = **01***
The first initial of your mother's first name	*e.g. Mother's name: Ann = **A***
Your code: _____	*In above example the code is: **LON01A***

(You will be asked about this code for the online questionnaire again so results can be linked)

7. If the conservation goals were not completely reached, please write any comments you have about the reasons for this *(e.g. lack of tools, discontinued due to bad weather, etc.)*:

8. Please write any comments you have about this questionnaire and the questions:

Please turn over

Researcher use only **A. Volunteering type:** ☐ Monitoring ☐ Conservation tasks ☐ Other: _____
B. Date: _____ **C. Weather start:**_____ **D. Weather end:**_____ **E. Organisation:**_____ **E. Data entered:** ____

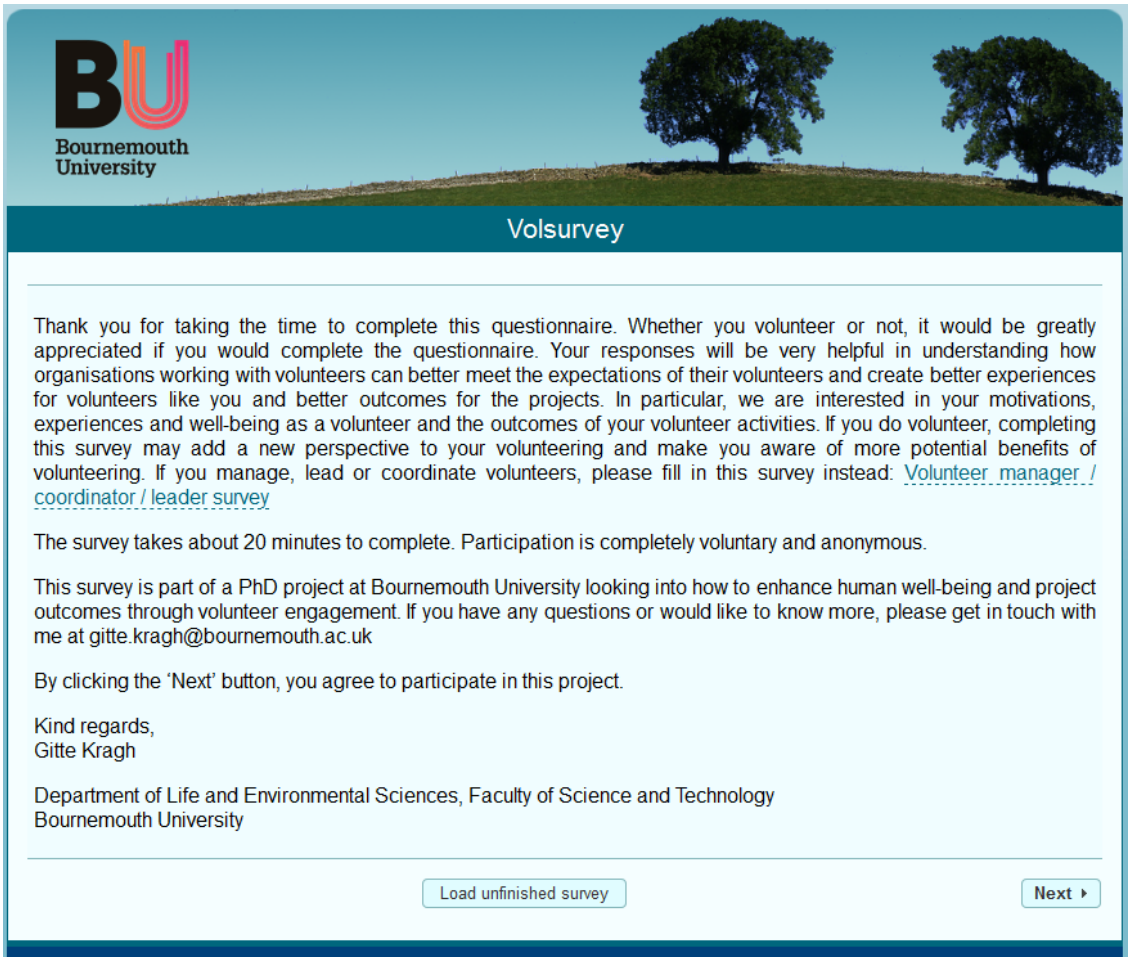
1. Please list the conservation <u>tasks</u> for the volunteer activity today, being as specific as you can *(e.g. collection of X number of records, collect records for certain species or species groups, planting X number of trees, clearing a certain area (X hectares) of invasive species, involving X number of volunteers, etc.):*	**<u>MORNING</u>** **2. Please indicate how important you think each task is for conservation on a scale from 1 (not at all important) to 7 (extremely important):**							**<u>AFTERNOON</u>** **3. Please indicate how well the conservation goals set for today's activity were reached on a scale from 1 (not at all achieved) to 7 (completely achieved).**						
Conservation tasks for volunteer activity today (fill in as many as are relevant. You can add more at the end of the day if the group did conservation tasks that were not planned from the beginning):	**1 (not at all)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely)**	**1 (not at all)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely)**
Conservation task 1:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 2:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 3:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 4:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conservation task 5:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

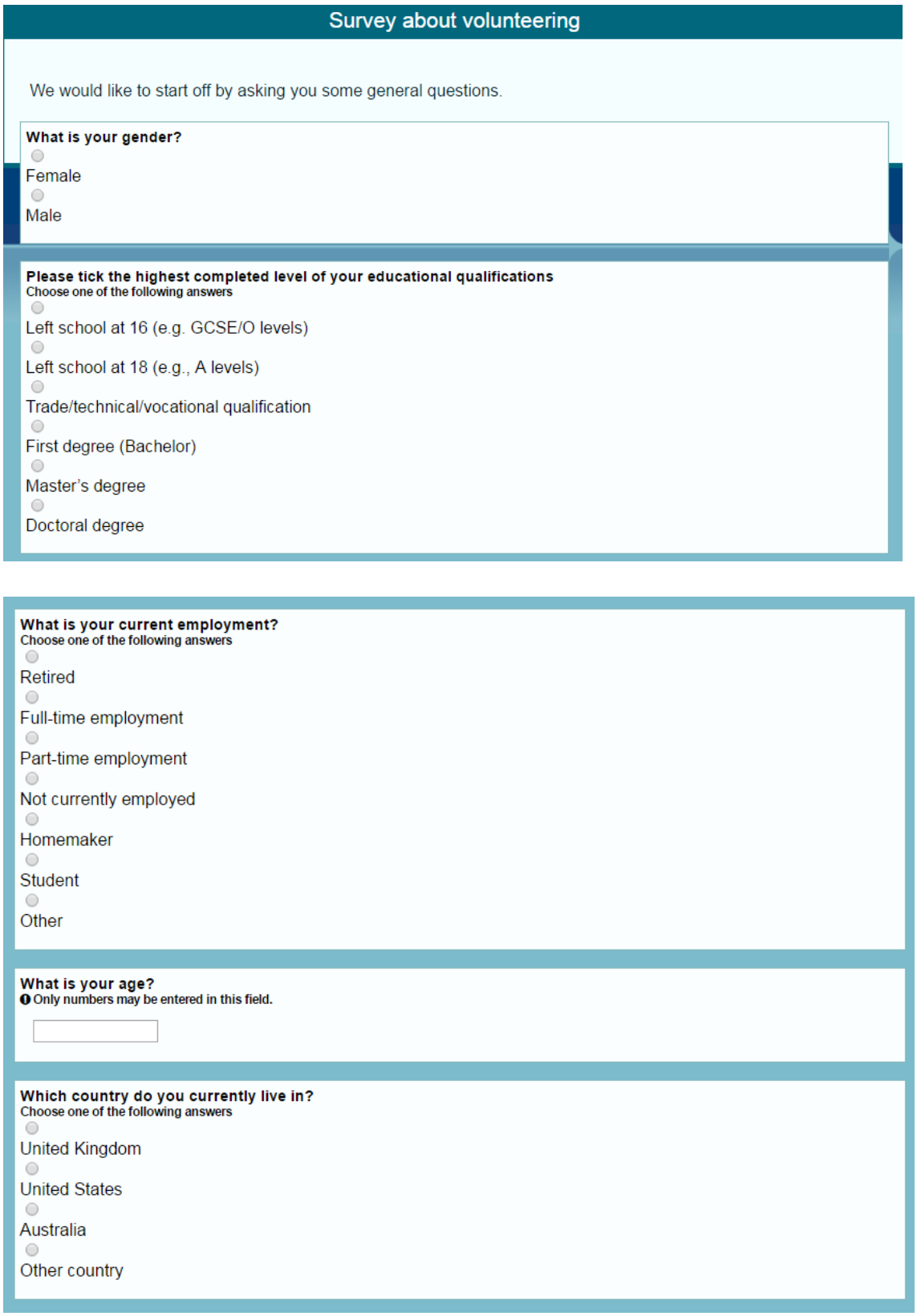
Please return to Gitte

Thank you for your help!

Appendix VI – Online volunteer questionnaire (study 2)

This is the current environmental volunteer questionnaire used in Study 2, the online survey. Similar surveys, but with appropriately adapted wording, were used for non-environmental volunteers as well as former and potential volunteers.





Survey about volunteering

We would like to start off by asking you some general questions.

What is your gender?

- Female
- Male

Please tick the highest completed level of your educational qualifications
Choose one of the following answers

- Left school at 16 (e.g. GCSE/O levels)
- Left school at 18 (e.g., A levels)
- Trade/technical/vocational qualification
- First degree (Bachelor)
- Master's degree
- Doctoral degree

What is your current employment?
Choose one of the following answers

- Retired
- Full-time employment
- Part-time employment
- Not currently employed
- Homemaker
- Student
- Other

What is your age?
Only numbers may be entered in this field.

Which country do you currently live in?
Choose one of the following answers

- United Kingdom
- United States
- Australia
- Other country

When did you last volunteer?
Choose one of the following answers

- In the last week
- 1-4 weeks ago
- 1-5 months ago
- 6-12 months ago
- Over a year ago
- I have never volunteered

Which type(s) of volunteering have you been involved with previously and/or currently (within the last 12 months) and/or would you be interested in getting involved with in the future *(please tick all that apply)*?

(If you have never volunteered and you are not considering volunteering in the future, please leave blank and click Next)

	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
A. Practical conservation tasks (such as planting trees, clearing areas, ranger, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
B. Biodiversity monitoring (such as butterfly, bird, other animal or plant surveys, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
C. Outdoor nature-focused activities other than A and B (such as guiding walks / outdoor nature interpretation, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
D. Citizen science projects other than B (such as climate or water monitoring, online projects e.g. Zooniverse, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
E. Indoor-based or administration-type activities for conservation / environmental organisation (such as fundraising, advocacy, membership or ticket sales)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
F. Gardening	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
G. Scouts, girlguiding or other outdoor activities for children/young people	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
H. Social, health and community service volunteering (such as hospitals, nursing homes, Samaritans, homeless shelters, legal aid, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
I. Culture, arts, heritage or archaeology (such as historical preservation, museums, art galleries, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
J. Sports and hobbies (such as coaching, active volunteer member of sports club, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
K. School or education-related volunteering	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
L. Religious volunteering (such as a religious congregation or religiously affiliated group, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
M. Advocacy (non-environmental) (such as political organisations, veteran's organisation, etc.)	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future
N. Other	I volunteered with this more than 12 months ago	I have volunteered with this within the past 12 months	I would like to volunteer with this in the future

Which environmental or conservation organisation or entity have you volunteered *most often* (most times) with in the last 12 months *(e.g. RSPB, a local wildlife trust, BTO, etc)*?

For example, if you volunteer for two organisations, one whole day once a week with organisation 1 and 2 hours twice a week with organisation 2, please write the name of organisation 2

Please answer all further questions about your volunteering for this particular 'main' organisation, unless otherwise stated.

How much of your volunteer time do you spend outdoors?

	All (100%)	Most (80-99%)	A lot (50-79%)	Some (20-49%)	Little (1-19%)	None (0%)
Volunteering with your 'main' organisation	**All (100%)**	**Most (80-99%)**	**A lot (50-79%)**	**Some (20-49%)**	**Little (1-19%)**	**None (0%)**
Volunteering with any other organisation	**All (100%)**	**Most (80-99%)**	**A lot (50-79%)**	**Some (20-49%)**	**Little (1-19%)**	**None (0%)**

We would like to know a bit about why you volunteer as this is important information for organisations to be able to better meet expectations from volunteers and create an even better experience for volunteers like you.

There are 4 pages with questions about your motivation.

Please rate the following reasons why you volunteer with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is a way to meet new people with similar interests	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering allows me to spend time with family/friends	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Family and friends place a high value on volunteering	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I enjoy being part of a cohesive volunteer team	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I like being part of a larger community of volunteers	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering allows me to use my skills	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I can learn new things	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering allows me to gain a wider perspective on the world	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is fun	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate your motivations for volunteering with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering allows me to discover new areas/species that I did not have access to earlier	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I enjoy spending time volunteering outdoors	1 (not at all important)	2	3	4	5	6	7 (extremely important)
By volunteering I can get exercise/better health	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering makes me feel needed	1 (not at all important)	2	3	4	5	6	7 (extremely important)
No matter how bad I have been feeling, volunteering makes me feel better	1 (not at all important)	2	3	4	5	6	7 (extremely important)
By volunteering I feel less lonely	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering allows me to spend time in a beautiful setting	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering provides an escape from all the demands of everyday life	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I feel I am doing something worthwhile	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate your motivations for volunteering with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I believe I can make a difference	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I feel it is important to help	1 (not at all important)	2	3	4	5	6	7 (extremely important)
My spiritual/religious beliefs encourage me to help	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I can do something for a cause that is important to me	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering can help me to get my foot in the door at a place where I would like to work	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I can make new contacts that might help my business or career	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering experience will look good on my CV	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I can learn skills that support my career development	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is an opportunity to get practical hands-on experience	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I am excited to contribute to original scientific research	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate your motivations for volunteering with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is a way for me to contribute to environmental sustainability	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I can help to protect the environment for future generations	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is a way for me to give something back to the environment	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I can help identify/eliminate threats to the environment	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I enjoy seeing improvements to the environment due to my volunteering effort	1 (not at all important)	2	3	4	5	6	7 (extremely important)
I can help collect information to improve the management of the area	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Which other motivations are important to you as reasons for your volunteering?

We are also interested in knowing something about your volunteer experience

Please rate the following statements on a scale from 1 (strongly disagree) to 7 (strongly agree).

	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
By volunteering I learn skills that are or will be useful in my career	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
By volunteering with my 'main' organisation, I make new contacts that might help my business or career	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I learn something new about the world by volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I learn more about nature by volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
My self-esteem is enhanced by performing volunteer work with my 'main' organisation	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I feel better about myself as a result of my volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
The work I perform as a volunteer is appreciated	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)

Your volunteer experience (continued): Please rate the following statements on a scale from 1 (strongly disagree) to 7 (strongly agree).

	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I live up to the expectations of my friends or family by volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I am able to escape some of my troubles by volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
By volunteering I feel less lonely	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I am able to express my personal values by volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I am doing something for a cause that I believe in by volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
By volunteering I can contribute to scientific research	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I can see improvements to the environment as a result of my volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)
I have fun when volunteering	1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)

Is there anything else you would like to tell us about your volunteer experience?

The next set of questions explores volunteer well-being. Volunteer well-being is important and therefore even though some of the following questions might seem slightly odd, please reply as best you can. The questions are in relation to your well-being whilst you volunteer. There are 4 pages with questions about your well-being whilst volunteering.

Please rate the following statements on a scale from 0 to 10

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
Overall, how satisfied are you with your volunteer experience?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

Please rate the following statements on a scale from 0 to 10

	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
How much of the time do you feel you are making progress towards accomplishing your goals while volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
To what extent do you become absorbed in your volunteering tasks?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
How much of the time do you feel joyful during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
How much of the time do you feel anxious during your volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)

Your sense of well-being whilst volunteering (continued).

Please rate the following statements on a scale from 0 to 10

	0 (terrible)	1	2	3	4	5	6	7	8	9	10 (excellent)
How would you say your health is right after volunteering?	0 (terrible)	1	2	3	4	5	6	7	8	9	10 (excellent)

Please rate the following statements on a scale from 0 to 10

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you achieve the important goals you set for yourself during your volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you find your volunteering purposeful and meaningful?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you receive help and support from others when you need it during your volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you feel that what you do during your volunteering is valuable and worthwhile?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you feel excited and interested in things during your volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
How lonely do you feel during your volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

Your sense of well-being whilst volunteering (continued).

Please rate the following statements on a scale from 0 to 10

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
How satisfied are you with your physical health right after having volunteered?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

Please rate the following statements on a scale from 0 to 10

	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
How much of the time do you feel positive during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
How much of the time do you feel frustrated during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
During your volunteering, how often are you able to handle your responsibilities?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
How much of the time do you feel sad during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
To what extent do you lose track of time during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)

Your sense of well-being whilst volunteering (continued). These are the last questions related to your sense of well-being whilst volunteering.

Please rate the following statements on a scale from 0 to 10

	0 (terrible)	1	2	3	4	5	6	7	8	9	10 (excellent)
Compared to others of your same age and sex, how is your health right after volunteering?	0 (terrible)	1	2	3	4	5	6	7	8	9	10 (excellent)

Please rate the following statement on a scale from 0 to 10

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you feel you have a sense of direction in your volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
How satisfied are you with your interactions with other people during volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you feel appreciated during your volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
To what extent do you feel contented right after having volunteered?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
How happy are you right after volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

We are also interested in how much and how often you volunteer, so the following questions relate to your time commitment, organisations you volunteer with and how your volunteering is structured.

How often do you volunteer...

	Several times a week	Once a week	Once or twice a month	Once every 2-3 months	Once or twice a year	Never
...in organised groups with your 'main' organisation?	Several times a week	Once a week	Once or twice a month	Once every 2-3 months	Once or twice a year	Never
...with friends/family in an informal group for your 'main' organisation?	Several times a week	Once a week	Once or twice a month	Once every 2-3 months	Once or twice a year	Never
...on your own for your 'main' organisation?	Several times a week	Once a week	Once or twice a month	Once every 2-3 months	Once or twice a year	Never
...in organised groups with any other organisation?	Several times a week	Once a week	Once or twice a month	Once every 2-3 months	Once or twice a year	Never
...with friends/family in an informal group for any other organisation?	Several times a week	Once a week	Once or twice a month	Once every 2-3 months	Once or twice a year	Never
...on your own for any other organisation?	Several times a week	Once a week	Once or twice a month	Once every 2-3 months	Once or twice a year	Never

Your volunteer time

Only numbers may be entered in these fields.

	In total, how many years have you volunteered...	Within the last 12 months (or since you started volunteering if less than 12 months ago), on average how many hours per month have you volunteered...
...in organised groups with your 'main' organisation?	**In total, how many years have you volunteered...**	**Within the last 12 months (or since you started volunteering if less than 12 months ago), on average how many hours per month have you volunteered...**
...with friends/family in an informal group for your 'main' organisation?	**In total, how many years have you volunteered...**	**Within the last 12 months (or since you started volunteering if less than 12 months ago), on average how many hours per month have you volunteered...**
...on your own for your 'main' organisation?	**In total, how many years have you volunteered...**	**Within the last 12 months (or since you started volunteering if less than 12 months ago), on average how many hours per month have you volunteered...**
...in organised groups with any other organisations?	**In total, how many years have you volunteered...**	**Within the last 12 months (or since you started volunteering if less than 12 months ago), on average how many hours per month have you volunteered...**
...with friends/family in an informal group for any other organisations?	**In total, how many years have you volunteered...**	**Within the last 12 months (or since you started volunteering if less than 12 months ago), on average how many hours per month have you volunteered...**
...on your own for any other organisation?	**In total, how many years have you volunteered...**	**Within the last 12 months (or since you started volunteering if less than 12 months ago), on average how many hours per month have you volunteered...**

How long do you intend to keep volunteering...

	Less than a year	1-2 years	3 years or more	Not applicable
...in organised groups with your 'main' organisation?	Less than a year	1-2 years	3 years or more	Not applicable
...with friends/family in an informal group for your 'main' organisation?	Less than a year	1-2 years	3 years or more	Not applicable
...on your own for your 'main' organisation?	Less than a year	1-2 years	3 years or more	Not applicable
...in organised groups with any other organisations?	Less than a year	1-2 years	3 years or more	Not applicable
...with friends/family in an informal group for any other organisations?	Less than a year	1-2 years	3 years or more	Not applicable
...on your own for any other organisation?	Less than a year	1-2 years	3 years or more	Not applicable

These questions explore your volunteer activities.
(After this page there are only 3 pages with questions left)

Thinking about the conservation activities you do while volunteering (e.g. removing unwanted species, recording species, planting, etc.), please list the 3 activities you do the most:
(you do not have to fill in all three activities if you only do one activity)

Conservation activity #1

Conservation activity #2

Conservation activity #3

Please rate how important you think each of the activities you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)

	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate to what extent you think the goals of the conservation activities you listed above are generally reached on a scale from 1 (never achieved) to 7 (always achieved)

	1 (never achieved)	2	3	4	5	6	7 (always achieved)

These questions explore the outcomes of your volunteer activities.

(After this page there are only 2 pages with questions left)

Thinking about the conservation outcomes (the effect of your activities) from your volunteering (e.g. habitat improvement, increased species recording, eradication of invasive species, etc.), please list the 3 conservation outcomes you believe to be most important:

Important conservation outcome from your volunteering #1

Important conservation outcome from your volunteering #2

Important conservation outcome from your volunteering #3

Please rate how important you think each outcome you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)

	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate to what extent you think each conservation outcome you listed above is generally reached by volunteering activities on a scale from 1 (never achieved) to 7 (always achieved)

	1 (never achieved)	2	3	4	5	6	7 (always achieved)

Please write any comments you have about this questionnaire, the questions, how you think about motivation or what well-being means to you

Previous | Resume later | Submit

Appendix VII – Online volunteer manager questionnaire (study 3)

This is the current environmental volunteer manager questionnaire used in Study 3, the online survey. Similar surveys, but with appropriately adapted wording, were used for non-environmental volunteer managers and former volunteer managers.

Survey for volunteer managers / coordinators / leaders

We would like to start off by asking you some general questions.

What is your gender?

- Female
- Male

Please tick the highest completed level of your educational qualifications

- Left school at 16 (e.g. GCSE/O levels)
- Left school at 18 (e.g., A levels)
- Trade/technical/vocational qualification
- First degree (Bachelor)
- Master's degree
- Doctoral degree

What is your current employment?

- Retired
- Full-time employment
- Part-time employment
- Not currently employed
- Homemaker
- Student
- Other

What is your age?

ℹ Only numbers may be entered in this field.

Which country do you currently live in?

- United Kingdom
- United States
- Australia
- Other country

When did you last manage or lead volunteers?

- In the last week
- 1-4 weeks ago
- 1-5 months ago
- 6-12 months ago
- Over a year ago
- I have never managed or led volunteers

In total, how many years have you managed volunteers...

Only numbers may be entered in these fields.

...for your 'main' organisation?

...for any other organisation?

We are interested in what type(s) of volunteering people get involved with or might be interested in getting involved with.

Which type(s) of volunteers have you managed previously and/or currently (within the last 12 months) and/or would you be interested in managing in the future (please tick all that apply)?

Please choose at least one type of previous or current volunteer type

	I managed this type of volunteers more than 12 months ago	I have managed this type of volunteers within the past 12 months	I would like to manage this type of volunteers in the future
A. Practical conservation tasks (such as planting trees, clearing areas, ranger, etc.)	I managed this type of volunteers more than 12 months ago	I have managed this type of volunteers within the past 12 months	I would like to manage this type of volunteers in the future
B. Biodiversity monitoring (such as butterfly, bird, other animal or plant surveys, etc.)	I managed this type of volunteers more than 12 months ago	I have managed this type of volunteers within the past 12 months	I would like to manage this type of volunteers in the future
C. Outdoor nature-focused activities other than A and B (such as guiding walks / outdoor nature interpretation, etc.)	I managed this type of volunteers more than 12 months ago	I have managed this type of volunteers within the past 12 months	I would like to manage this type of volunteers in the future
D. Citizen science projects other than B (such as climate or water monitoring, online projects e.g. Zooniverse, etc.)	I managed this type of volunteers more than 12 months ago	I have managed this type of volunteers within the past 12 months	I would like to manage this type of volunteers in the future
E. Indoor-based or administration-type activities for conservation / environmental organisation (such as fundraising, advocacy, membership or ticket sales)	I managed this type of volunteers more than 12 months ago	I have managed this type of volunteers within the past 12 months	I would like to manage this type of volunteers in the future
F. Gardening	I managed this type of volunteers more than 12 months ago	I have managed this type of volunteers within the past 12 months	I would like to manage this type of volunteers in the future

G. Scouts, girlguiding or other outdoor activities for children/young people	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future
H. Social, health and community service volunteering (such as hospitals, nursing homes, Samaritans, homeless shelters, legal aid, etc.)	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future
I. Culture, arts, heritage or archaeology (such as historical preservation, museums, art galleries, etc.)	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future
J. Sports and hobbies (such as coaching, active volunteer member of sports club, etc.)	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future
K. School or education-related volunteering	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future
L. Religious volunteering (such as a religious congregation or religiously affiliated group, etc.)	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future
M. Advocacy (non-environmental) (such as political organisations, veteran's organisation, etc.)	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future
N. Other	☐ I managed this type of volunteers more than 12 months ago	☐ I have managed this type of volunteers within the past 12 months	☐ I would like to manage this type of volunteers in the future

Which environmental or conservation organisation or entity have you managed volunteers for *most often* (most times) in the last 12 months *(e.g. RSPB, a local wildlife trust, BTO, etc)*?

(For example, if you manage volunteers for two organisations, one whole day once a week with organisation 1 and 2 hours twice a week with organisation 2, please write the name of organisation 2)

Please answer all further questions in relation to your volunteer management for this particular 'main' organisation.

How much of your volunteer manager time do you spend with the volunteers?

	All (100%)	Most (80-99%)	A lot (50-79%)	Some (20-49%)	Little (1-19%)	None (0%)	N/A
With your 'main' organisation	**All (100%)**	**Most (80-99%)**	**A lot (50-79%)**	**Some (20-49%)**	**Little (1-19%)**	**None (0%)**	**N/A**
With any other organisation	**All (100%)**	**Most (80-99%)**	**A lot (50-79%)**	**Some (20-49%)**	**Little (1-19%)**	**None (0%)**	**N/A**

These questions explore the activities of your volunteers.

Thinking about the conservation activities your volunteers perform (such as removing unwanted species, recording species, planting, etc.), please list the 3 activities your volunteers do the most:

(you do not have to fill in all three activities if your volunteers only do one activity)

Conservation activity #1

Conservation activity #2

Conservation activity #3

Please rate how important you think each of the activities you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)

	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate to what extent you think the goals of the conservation activities you listed above are generally reached on a scale from 1 (never achieved) to 7 (always achieved)

	1 (never achieved)	2	3	4	5	6	7 (always achieved)

These questions explore the outcomes of the activities of your volunteers.

Thinking about the conservation outcomes, i.e. the effects of your volunteers' activities such as habitat improvement, increased species recording, eradication of invasive species, etc., please list the 3 conservation outcomes you believe to be most important for conservation:

Important conservation outcome #1

Important conservation outcome #2

Important conservation outcome #3

Please rate how important you think each outcome you listed above is for conservation on a scale from 1 (not at all important) to 7 (extremely important)

	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate to what extent you think each conservation outcome you listed above is generally reached by volunteering activities on a scale from 1 (never achieved) to 7 (always achieved)

	1 (never achieved)	2	3	4	5	6	7 (always achieved)

We would like to know what you think motivate volunteers to be able to compare volunteer managers' perceptions of volunteer motivations with volunteers' actual motivations. This is important information for organisations to be able to better manage volunteers.

Please rate how important you think the following are for people to volunteer with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is a way to meet new people with similar interests	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
Volunteering allows people to spend time with family/friends	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
Family and friends of volunteers place a high value on volunteering	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
People enjoy being part of a cohesive volunteer team	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
People like to be part of a larger community of volunteers	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
Volunteering allows people to use their skills	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
Volunteers can learn new things	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
Volunteering allows people to gain a wider perspective on the world	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**
Volunteering is fun	**1 (not at all important)**	**2**	**3**	**4**	**5**	**6**	**7 (extremely important)**

Please rate how important you think the following are for people to volunteer with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering allows people to discover new areas/species that they did not have access to before	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers enjoy spending time volunteering outdoors	1 (not at all important)	2	3	4	5	6	7 (extremely important)
By volunteering people can get exercise/better health	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering makes people feel needed	1 (not at all important)	2	3	4	5	6	7 (extremely important)
No matter how bad people have been feeling, volunteering makes them feel better	1 (not at all important)	2	3	4	5	6	7 (extremely important)
By volunteering people feel less lonely	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering allows people to spend time in a beautiful setting	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering provides an escape from all the demands of everyday life	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers feel like they are doing something worthwhile	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate how important you think the following are for people to volunteer with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers believe they can make a difference	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers feel it is important to help	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers' spiritual/religious beliefs encourage them to help	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers can do something for a cause that is important to them	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering can help people to get a foot in the door at a place where they would like to work	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers can make new contacts that might help their business or career	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteer experience would look good on their CV	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers can learn new skills that support their career development	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is an opportunity to get practical hands-on experience	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers are excited to contribute to original scientific research	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Please rate how important you think the following are for people to volunteer with your 'main' organisation from 1 (not at all important/accurate) to 7 (extremely important/accurate):

	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is a way for people to contribute to environmental sustainability	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers can help to protect the environment for future generations	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteering is a way for people to give something back to the environment	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers can help identify/eliminate threats to the environment	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers enjoy seeing improvements within the areas where they volunteer or to the environment due to their volunteering effort	1 (not at all important)	2	3	4	5	6	7 (extremely important)
Volunteers can help collect information to improve the management of an area	1 (not at all important)	2	3	4	5	6	7 (extremely important)

Which other factors do you think are important motivations for people who volunteer?

The next set of questions explores perceptions of volunteer well-being. The questions are in relation to your perception of the well-being of volunteers whilst they volunteer.

(There are 4 pages with questions about volunteer well-being whilst volunteering)

Please rate the following statement related to your perception of volunteer well-being in your 'main' organisation.

To what extent do you think that volunteers...

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...are satisfied with their volunteer experience overall?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

Please rate the following statements related to your perception of volunteer well-being in your 'main' organisation.

To what extent do you think that volunteers...

	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...feel they are making progress towards accomplishing their goals while volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...become absorbed in their volunteering tasks?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...feel joyful during their volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...feel anxious during their volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)

Volunteers' sense of well-being whilst volunteering (continued).

Please rate the following statements related to your perception of volunteer well-being in your 'main' organisation.

To what extent do you think that volunteers...

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...achieve the important goals they set for themselves during their volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...find their volunteering purposeful and meaningful?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...feel they receive help and support from others when they need it during their volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...feel that what they do during their volunteering is valuable and worthwhile?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...feel excited and interested in things during their volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...feel lonely during their volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

Volunteers' sense of well-being whilst volunteering (continued).

Please rate the following statement related to your perception of volunteer well-being in your 'main' organisation.

To what extent do you think that volunteers...

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...are satisfied with their physical health right after having volunteered?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

Please rate the following statements related to your perception of volunteer well-being in your 'main' organisation.

To what extent do you think that volunteers...

	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...feel positive during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...feel frustrated during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...are able to handle their responsibilities during their volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...feel sad during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)
...lose track of time during volunteering?	0 (never)	1	2	3	4	5	6	7	8	9	10 (always)

Volunteers' sense of well-being whilst volunteering (continued).

Please rate the following statements related to your perception of volunteer well-being in your 'main' organisation.

To what extent do you think that volunteers...

	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...feel they have a sense of direction in their volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...are satisfied with their interactions with other people during volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...feel appreciated during their volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...feel contented right after having volunteered?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)
...are happy right after volunteering?	0 (not at all)	1	2	3	4	5	6	7	8	9	10 (completely)

Please write any comments you have about this questionnaire, the questions, volunteer motivation, well-being or management:

Appendix VIII – Participating organisations

A. List of organisations participating in Study 1:

Volunteer organisations:

Cornwall Wildlife Trust

Devon Wildlife Trust

Dorset Flora Group

Dorset Wildlife Trust

Exmoor National Park (Signal Crayfish Group)

Forestry Commission (New Forest)

Hampshire and Isle of Wight Wildlife Trust

National Trust (Purbecks)

Somerset Botany Group

Walking groups:

New Forest Walkers

Verwood Ramblers

Universities and colleges:

Bournemouth and Poole College

Bournemouth University

Kingston Maurward College

B. List of organisations of volunteer respondents in Study 2 and volunteer manager respondents in Study 3

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Acid Rain Monitoring Project					1	
African Dawn Wildlife Reserve		1				
Akazul					1	
All Out Africa					1	
Amphibian & Reptile Conservation Trust (ARC)		6			1	
Anza Borrego Desert State Park		1				
Archelon (STPS)		1				
ARG UK		1				
ARMI		1				
Australian Citizen Science Association		1				
Australian Volunteer Coast Guard 2 Surf Lifesaving		1				
Berks, Bucks & Oxon Wildlife Trust	1					
Bethany co-op				1		
Boone Country Conservation District		1				
Botanic Gardens Conservation International						1
Bournemouth Natural Science Society	3	1				
Bournemouth Borough Council				1		
Bournemouth Tree Wardens	1					
British Ecological Society		1				
British Trust for Ornithology (BTO)	2	5				
BTCV	2					
Bumblebee Conservation Trust		1				
Butterfly Conservation		9	1		2	

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Calder & Colne Rivers Trust		2				
Canadian Sea Turtle Network					1	
Canal Trust	1	1				
Church of Scotland		1				
Cockermouth Mountain Rescue Team	1					
Collision Count Project (through the Miistakis Institute)					1	
Conservation Trust of Puerto Rico				1		
Cornish Ancient Sites Protection Network (CASPN)/Lizard Ancient Sites Network		1				
Cornwall Wildlife Trust		5		1	2	
Countryside Restoration Trust (CRT)		1				
Cumbria Wildlife Trust		1				
Danmarks Naturfredningsforening		1				
Defenders of Wildlife 5	1					
Derby City Pond Warden Association		1				
Devils@Cradle, Tasmania	1					
Devon Wildlife Trust	1	1			1	
Discovery Passage Sealife Society		1				
Dormouse Group, Lincolnshire		1				
Dorset Bat Group		1				
Dorset Countryside Volunteers		3				
Dorset Mammal Group				1		
Dorset Wildlife Trust	2	3		1	4	2
Durlston Country Park (Dorset County Council)		1			1	
Earth, Sea & Sky (Ionian Nature Conservation)		1				
Earthwatch					1	
Eden Rivers Trust					1	
English Heritage				1		

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Environment Agency		1				
Essex Wildlife Trust		1				
Exmoor National Park	1	2				
Faith Links Bournemouth and Poole HMD committee		1				
Forestry Commission (incl. New Forest Two Trees)	3	15			2	
Forests of the World (DK)				1		
Friends of Epping Forest		1				
Friends of Leckhampton Hill (FOLK)		1				
Friends of Lepe Country Park	1	4				
Friends of New Forest Academy		1				
Friends of Norton Common, Letchworth		1				
Friends of the Earth		1				
Friends of the Lake District		2				
Friends of Upton Country Park	1					
Global Vision International (GVI)	1					
Go Volunteer - Student Led Volunteering at University					1	
Greenpeace Greece		1				
Groundswell Homeless Health Peer Advocacy Project		2			1	
Gwent Wildlife	1					
Hampshire and Isle of Wight Wildlife Trust	2	9			2	
Hampshire County Council countryside service		1				
Hampshire Fire and Rescue Services		1			1	1
Harvard Forest Schoolyard Long-Term Ecological Research			1			
Headway Dorset and Dorset Mind					1	
Highgate Cemetery		1				

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Highland Museum of Childhood	1					
Jacksonville Zoo and Gardens					1	
KEFI					1	
Keswick Museum		1				
Lake District National Park	5	28	1	1	2	
Lancashire Wildlife Trust					1	
Latin American Sea Turtles (LAST)					1	
Lincolnshire Dormouse Group		1				
Little Saint Simons Island		1				
Local Wildlife Trust	4	8		1	9	
Macmillan Cancer Support					1	
Maio Biodiversity Foundation					1	
Maple Lodge Conservation Society		1				
Marine Conservation Society					1	
Marwell Wildlife/National Trust		1				
McDowell Sonoran Conservancy					1	
Medasset	3	1	1		1	
Monarch Larva Monitoring Project					1	
Montana Wilderness Association	1					
Moors Valley Country Park		6				
Mountain rescue team		1				
National Citizen Programme				1		
National Geographic					1	
National Lobster Hatchery		1				
National Plant Monitoring Scheme		1				
National Trust	5	28	4	1	6	
National Trust for Scotland		1			2	
Natural England		1				

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Natural History Museum					2	
Natural History Society of Northumbria		1				
Natures Garden		1				
New Caledonian Woodlands		1				
New Forest Area Conservation Volunteers					1	
Norfolk Geodiversity Partnership		1				
Norfolk Wildlife Trust		1		1		
North Pennines AONB Partnership		1			1	
North Yorks Moors National Park	1	1				
NorthTyneside Council		1				
NZ Open Golf		1				
OXARG		1				
Oxfam		1				
Para la Naturaleza					1	
Peterborough Cathedral						1
Plantlife (NPMS survey)		1				
Pondhead Conservation Trust		6			1	
Poole Citizens Advice					1	
Poole Sailability					1	
Poole Volunteer Centre					1	
PSP Association						1
Radio Society of Great Britain	1					
Radnorshire Wildlife Trust		1			1	
Ramblers	1					
Red Cross	1					

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Red River Rescuers		1				
Red Squirrel Project (Joint Scottish Wildlife Trust / SNH / Local authority)		1				
Rennie Grove Hospice Care					1	
Ribble Rivers Trust	1					
Richmond Fellowship - Kirklees and Wakefield					1	
River Chess Association		1				
Riverfly Partnership	4	17		1	3	
Romsey and Waterside Day Services		1				
RSPB	5	5			3	1
RSPCA Cambridge branch					1	
Salvation Army		1				
Samaritans					1	
Scottish Wildlife Trust		6		1	1	
Scouting / girlguiding		3				
Sea Turtle Foundation	1					
Seasearch		1				
Shared Interest					1	
Shoresearch	1					
Sightsavers						1
Solihull Conservation Volunteers					1	
Somerset House Trust						1
Somerset Wildlife Trust		1			2	
South Coast Panel of Cricket Umpires	1					
South Downs National Park Authority	1	4			1	
South Somerset Archaeological Research Group		1				
Space Youth Project					1	
SPEAR					1	
St John Ambulance	1					

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Sunday Assembly Bournemouth		1				
Surfers Against Sewage		1				
Sussex Downs conservation board - now National park	1					
Sussex Wildlife Trust					1	
Sustrans	1					
Tearfund					1	
Tees Valley Wildlife Trust		1			1	
Thames21	1	1				
The Conservation Volunteers		3				
The Oregon Museum of Science and Industry					1	
The Wildlife Trust for Lancashire, Manchester and North Merseyside					1	
Thurrock Council (Langdon Hills Country Park)		1				
Transition Town					1	
Trekdi Adventure Works				1		
Trinidad Tiddlywinks Pre-school		1				
Village Magazine		1				
Vincent Wildlife Trust		1				
Warren Copse and Holbury Manor Conservation Group	1					
Warwickshire Wildlife Trust					1	
Water Quality Monitoring					1	
Waterside Foodbank		1				
Westonbirt Aboretum		1				
WHO			1			
WI		1				
Wildlife Disease Association		1				

	Volunteers			Volunteer Managers		
Organisation	**Former**	**Current**	**Potential**	**Former**	**Current**	**Potential**
Wildseas and Turtle Foundation					1	
Wilton Fly Fishing Club		1				
Woodland Trust	1	10			2	
Xamogelo tou Paidiou		1				
Yellowstone Association	1	5			1	
Yorkshire Wildlife Trust	1					
YouthNet					1	
Zooniverse	1					
ZSL	1					

Appendix IX – Publication based on chapter 3

ANALYSIS

The motivations of volunteers in citizen science

Gitte Kragh discusses the motivations that drive volunteers to participate in citizen science.

Millions of people worldwide spend their valuable time engaged in volunteering. Why? It all starts with the concept of motivation and therefore exploring motivations can provide some answers. Motivation is the reason for acting or behaving in a certain manner. Although all volunteers share a similar behaviour, freely giving their time without financial gain to the mutual benefit of the cause and themselves, they do not necessarily have the same motivations for doing so[1]. Why is it important to understand what motivates volunteers in citizen science? Because citizen science projects depend on their volunteers, understanding the motivations of volunteers can enhance recruitment, ensure good retention rates and ultimately make the citizen science project a success.

PARTICIPATION IN CITIZEN SCIENCE PROJECTS

Members of the public interested in participating in science have a wide range of opportunities. Citizen science is increasingly used in many different scientific fields, including astronomy, biotechnology, environmental science and ecology. This diversity provides a huge array of projects with very different volunteer tasks, from categorising galaxies or analysing DNA sequences online, to outdoor monitoring of plants and animals, and hands-on collection of air or water samples. It also provides a variety of different social setups for participants to choose from, with projects offering anything from large group activities to individual-based participation. Some projects are based in the local community, whereas others are large mass participation projects running worldwide, providing very different experiences of volunteer communities. Finally, the opportunities to participate in projects at diverse levels vary significantly from basic crowdsourcing, to fully collaborative projects where volunteers work closely with professional scientists to decide which scientific problems to address and how to address them. Projects are not necessarily limited to one level of participation, as exemplified in the National Trust biodiversity monitoring project, "The Cyril Diver Project"[2]. Here most volunteers were engaged at a medium level and conducted biodiversity surveys whilst a few volunteers were engaged at the top level, collaborating in problem definition, data collection and analyses. Considering all these options and opportunities for participation, it is hardly surprising that millions engage in citizen science projects and that their reasons for doing so are varied.

RESEARCH INTO VOLUNTEER MOTIVATION

Interestingly, even though citizen science has a long tradition stretching back hundreds of years and currently involves millions of people, the motivations of volunteers in this area have rarely been studied[3], and only in the last ten years has this area received any significant interest from the research community. Early research on volunteer motivation developed within the social sector in the 1960s and 1970s and was based on general, and more specifically, employee, motivation theories. However, due to differences between employees and volunteers, such as the lack of remuneration for volunteers, research has since expanded to try to identify which factors drive volunteers specifically. Some features of volunteer motivation have been found to apply in any volunteering context. For example, factors external to the project such as employment status and age can influence volunteer motivations. For instance, younger people were more inclined to volunteer by their desire to gain experience and further their career than older people who were already in a job or retired[4]. Just as motivations differ between individuals, they can vary for the same individual at different times[5,6]. The reasons to volunteer in the first place may be different to the reasons given to continue volunteering, either in the short term or as a dedicated volunteer in the long term. This change in motivation can come about not only due to changes in external factors, but also by participation in the volunteer activity itself. In one study, self-directed (egoistic) motivations, such as personal interest, were shown to be the most important for initial commitment for a volunteer, whereas a deeper altruistic reason, such as a concern for the environment, was needed for long-term participation to occur[7]. In another study, this was reversed; volunteers were initially altruistically motivated, wanting to improve the environment, and only later did self-directed motives, such as enjoying being outdoors, learning new skills and meeting new people, become important[8]. Whilst motivations do change over time, often more than one motivation is important to volunteers at any one time[9].

"Because citizen science projects depend on their volunteers, understanding the motivations of volunteers can enhance recruitment, ensure good retention rates and ultimately make the citizen science project a success."

VOLUNTEER MOTIVATIONS IN CITIZEN SCIENCE

Both self-directed and altruistic motives are often important to volunteers. For participants in any kind of citizen science project, self-directed motives may include: personal interest in the topic under investigation, such as astronomy, protein structure or wildlife; wanting to learn more about the topic; or a desire to discover

something new, such as gaining access to new places, species or discovering new galaxies (see **Table 1** for details). Depending on the type of citizen science project and form of participation, other self-directed motives may be present. For example, volunteering provides an opportunity for recreation and spending time in nature for participants in environmental projects, whereas, social motives are not rated as highly. One potential reason for the relatively low importance rating could be that participation in many projects is carried out alone, whether in online projects or environmental monitoring. This individualistic setup of project participation could deter potential participants who are looking to meet like-minded people and to join a community. To counter this, many projects have set up online forums and use social media to create virtual volunteer communities to provide opportunities for volunteers to meet each other, discuss findings and get support from their project leaders, if needed. Career motives, such as volunteering to gain experience for their CV or to "get a foot in the door" at a desired place to work, are often not mentioned in citizen science research. When career motives were mentioned, it was in the responses from students or young people[7,10]. Many volunteers in citizen science projects are older (40-60 years old) or retired[11,12] and have no need to gain experience or contacts to further their careers. It is now generally accepted that most volunteers have some self-directed reasons for volunteering; however, altruistic motives are often more important than self-directed motives.

An important altruistic motive for participants in many different citizen science projects is their wish to contribute to science, a drive that is unique to citizen science and sets it apart from other volunteering opportunities. Other altruistic motives, such as volunteering for a cause or feeling it is important to help, are significant for many as well. Participants in environmental citizen science projects, like biodiversity monitoring, are often altruistically motivated because they are concerned about the environment and feel it is important to help conservation efforts.

MEETING VOLUNTEERS' MOTIVATIONS

After understanding volunteers' motivations, the next step for citizen science projects is to meet these to ensure a high level of satisfaction and thus retention. If volunteers continue for longer, they will understand their tasks better and may therefore be able to perform to a higher standard. This can save resources because of a lower need for additional recruitment and training of new recruits[6], and it ultimately contributes to better outcomes for organisations and the causes they work for. If primary motivations are perceived by volunteers to be met, they become more satisfied[4,20] and they tend to keep volunteering for longer[1,21]. However, a recent study has shown that not all motivations are equal in relation to achieving volunteer satisfaction: altruistic motives were positively correlated with satisfaction and intention to continue volunteering, whereas self-directed motives were negatively correlated with satisfaction and intention to continue[22]. Meeting altruistic motivations of volunteers is therefore key to retaining volunteers. This means projects need to ensure sufficient and prompt feedback to volunteers on how their data contribute to science and therefore to their chosen cause.

With the current explosion in numbers and types of citizen science projects, there may be increased competition for volunteers in the future. As we learn more about why people volunteer with different citizen science projects and how motivations can be satisfied, this knowledge can be incorporated into volunteer management strategies that will attract and satisfy volunteers; the end result is that retention will be greater and volunteers will spread the word and encourage others to participate and ultimately help the project succeed.

▼ Table 1. Self-directed and altruistic motives of volunteers in citizen science. Often volunteers have more than one reason for participating in citizen science, and often it is a combination of self-directed and altruistic motives.

Self-directed motives	• Have a personal interest in the topic studied[10,11,12,13,14,15,16] • Desire to learn something new[9,17] • Desire to discover something new[11,18] • Desire to spend time in nature[9,10,12] • Socialising with like-minded people[9]
Altruistic motives	• Desire to volunteer for a cause[10,12,13,15,19] • Wish to contribute to science[11,12,14,15,16] • Feel it is important to help[14]

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Gitte Kragh has managed volunteers in ecological projects around the world and volunteered extensively herself for the past 20 years. She is currently finishing a PhD at Bournemouth University where she is researching how conservation outcomes and volunteers' wellbeing are linked and can be optimised by understanding and meeting volunteer motivations in ecological projects. (gitte.kragh@bournemouth.ac.uk)

REFERENCES

1. Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J. and Miene, P. (1998) Understanding and assessing the motivations of volunteers: A functional approach. Journal of Personality and Social Psychology, 74 (6), pp. 1516–1530.
2. National Trust, The Cyril Diver Project, https://www.nationaltrust.org.uk/studland-beach/features/the-cyril-diver-project.
3. Nov, O., Arazy, O. and Anderson, D. (2014) Scientists@Home: what drives the quantity and quality of online citizen science participation? PloS one, 9 (4), p. e90375.
4. Musick, M. A. and Wilson, J. (2008) Volunteers: a social profile Indiana. University Press, Bloomington.
5. Ryan, R. L., Kaplan, R. and Grese, R. E. (2001) Predicting Volunteer Commitment in Environmental Stewardship Programmes. Journal of Environmental Planning and Management, 44 (5), pp. 629–648.
6. Clary, E. G., Snyder, M. and Ridge, R. (1992) Volunteers' motivations: a functional strategy for the recruitment, placement, and retention of volunteers. Non-profit management and leadership, 2 (4), pp. 333–350.
7. Rotman, D., Hammock, J., Preece, J., Hansen, D., Boston, C., Bowser, A. and He, Y. (2014) Motivations affecting initial and long-term participation in citizen science projects in three countries. iConference 2014 Proceedings, pp. 110–124.
8. The Conservation Volunteers (2014) Volunteering Impacts. The Conservation Volunteers, Doncaster.
9. Bell, S., Marzano, M., Reinert, H., Cent, J., Kobierska, H., Grodzi ska-Jurczak, M., Podjed, D., Mursi , R., Vandzinskaite, D. and Armaitiene, A. (2008) What counts? Volunteers and their organisations in the recording and monitoring of biodiversity. Biodiversity and Conservation, 17 (14), pp. 3443–3454.
10. Johnson, M. F., Hannah, C., Acton, L., Popovici, R., Karanth, K. K. and Weinthal, E. (2014) Network environmentalism: Citizen scientists as agents for environmental advocacy. Global Environmental Change, 29, pp. 235–245.
11. Raddick, M. J., Bracey, G., Gay, P. L., Lintott, C. J., Cardamone, C., Murray, P., Schawinski, K., Szalay, A. S. and Vandenberg, J. (2013) Galaxy Zoo: Motivations of Citizen Scientists. Astronomy Education Review, 12 (1), pp. 1–27.
12. Wright, D. R., Underhill, L. G., Keene, M., and Knight, A. T. (2015) Understanding the Motivations and Satisfactions of Volunteers to Improve the Effectiveness of Citizen Science Programs. Society & Natural Resources, 28 (9), pp. 1013–1029.
13. Weston, M., Fendley, M., Jewell, R., Satchell, M. and Traros, C. (2003) Volunteers in bird conservation: Insights from the Australian Threatened Bird Network. Ecological Management and Restoration, 4 (3), pp. 205–211.
14. Davies, L., Bell, J. N. B., Bone, J., Head, M., Hill, L., Howard, C., Hobbs, S. J., Jones, D. T., Power, S. A., Rose, N., Ryder, C., Seed, L., Stevens, G., Toumi, R., Voulvoulis, N. and White, P. C. L. (2011) Open Air Laboratories (OPAL): A community-driven research programme. Environmental Pollution, 159 (8-9), pp. 2203–2210.
15. Hobbs, S. J. and White, P. C. L. (2012) Motivations and barriers in relation to community participation in biodiversity recording. Journal for Nature Conservation, 20 (6), pp. 364–373.
16. Curtis, V. (2015) Motivation to Participate in an Online Citizen Science Game: A Study of Foldit. Science Communication, 37 (6), pp. 723–746.
17. Thiel, M., Penna-Díaz, M. A., Luna-Jorquera, G., Salas, S., Sellanes, J. and Stotz, W. (2014) Citizen scientists and marine research: volunteer participants, their contributions, and projection for the future. Oceanography and Marine Biology: An Annual Review, 52, pp. 257–314.
18. Raddick, M. J., Bracey, G., Gay, P. L., Lintott, C. J., Murray, P., Schawinski, K., Szalay, A. S. and Vandenberg, J. (2010) Galaxy Zoo: Exploring the Motivations of Citizen Science Volunteers. Astronomy Education Review, 9 (1), pp. 10103–10118.
19. Krebs, V. (2010) Motivations of cybervolunteers in an applied distributed computing environment: MalariaControl.net as an example. First Monday. http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2788.
20. Finkelstein, M. A. (2008) Volunteer satisfaction and volunteer action: A functional approach. Social Behavior and Personality, 36 (1), pp. 9–18.
21. Stukas, A. A., Worth, K. A., Clary, E. G. and Snyder, M. (2009) The Matching of Motivations to Affordances in the Volunteer Environment: An Index for Assessing the Impact of Multiple Matches on Volunteer Outcomes. Nonprofit and Voluntary Sector Quarterly, 38 (1), pp. 5–28.
22. Stukas, A. A., Hoye, R., Nicholson, M., Brown, K. M. and Aisbett, L. (2016) Motivations to Volunteer and Their Associations With Volunteers' Well-Being. Nonprofit and Voluntary Sector Quarterly 45, (1), pp. 112–132.

Appendix X – Publication from chapter 4

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RESEARCH ARTICLE

Environmental volunteer well-being: Managers' perception and actual well-being of volunteers [version 1; referees: 1 approved]

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Abstract

Background: Environmental volunteering can increase well-being, but environmental volunteer well-being has rarely been compared to participant well-being associated with other types of volunteering or nature-based activities. This paper aims to use a multidimensional approach to well-being to explore the immediately experienced and later remembered well-being of environmental volunteers and to compare this to the increased well-being of participants in other types of nature-based activities and volunteering. Furthermore, it aims to compare volunteer managers' perceptions of their volunteers' well-being with the self-reported well-being of the volunteers. *Methods*: Onsite surveys were conducted of practical conservation and biodiversity monitoring volunteers, as well as their control groups (walkers and fieldwork students, respectively), to measure general well-being before their nature-based activity and activity-related well-being immediately after their activity. Online surveys of current, former and potential volunteers and volunteer managers measured remembered volunteering-related well-being and managers' perceptions of their volunteers' well-being. Data were analysed based on Seligman's multidimensional PERMA ('positive emotion', 'engagement', 'positive relationship', 'meaning', 'achievement') model of well-being. Factor analysis recovered three of the five PERMA elements, 'engagement', 'relationship' and 'meaning', as well as 'negative emotion' and 'health' as factors. *Results*: Environmental volunteering significantly improved positive elements and significantly decreased negative elements of participants' immediate well-being, and it did so more than walking or student fieldwork. Even remembering their volunteering up to six months later, volunteers rated their volunteering-related well-being higher than volunteers rated their well-being generally in life. However, volunteering was not found to have an effect on overall mean well-being generally in life. Volunteer managers did not perceive the significant increase in well-being that volunteers reported. *Conclusions*: This study showed how environmental volunteering immediately improved participants' well-being, even more than other nature-based activities. It highlights the benefit of regarding well-being as a multidimensional construct to more systematically understand, support and enhance volunteer well-being.

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Introduction

Natural environments have always been important for human well-being (Frumkin, 2001; Kellert & Wilson, 1993), and continue to be so as local environments become more urbanised (Kaplan, 1983). One way to harness the well-being benefits of natural environments is to participate in environmental volunteering, which can increase people's connection to nature and their sense of well-being (Gooch, 2005; O'Brien *et al.*, 2010; Pillemer *et al.*, 2010). Most research on volunteer well-being has focused on comparisons between volunteers and non-volunteers, elucidating differences in specific elements of well-being, such as happiness, life satisfaction, depression and survival (Jenkinson *et al.*, 2013; Konrath *et al.*, 2012; Thoits & Hewitt, 2001). Very few studies have addressed the questions of how volunteering immediately affects participants' well-being and how participants in different types of volunteering may gain benefits in different elements of well-being. In addition, no studies have examined how volunteer managers perceive the well-being of their volunteers and how this relates to actual volunteer well-being. This paper addresses these challenges by using a multidimensional well-being model to first explore the well-being of environmental volunteers and compare it to the well-being of participants in other similar types of nature-based activities and other types of volunteering. It then explores volunteer managers' perception of the well-being of their volunteers, and finally it compares this perceived well-being to the volunteers' self-reported well-being.

Volunteer well-being

Many studies have shown that volunteering is closely linked to increased well-being of volunteers (Binder & Freytag, 2013; Borgonovi, 2008; Greenfield & Marks, 2004; Jenkinson *et al.*, 2013; Koss & Kingsley, 2010; O'Brien *et al.*, 2010; Son & Wilson, 2012; Stukas *et al.*, 2016; Thoits & Hewitt, 2001; Townsend, 2006; Van Willigen, 2000; Wheeler *et al.*, 1998; Wilson, 2000). However, studies have used different definitions of well-being, and have therefore measured different constructs, which have often included only some aspects of well-being instead of taking a holistic approach. Two main approaches to conceptualising well-being prevail: hedonism and eudaimonia. Hedonism is the idea that maximisation of pleasure is the goal and the way to happiness for all humans, whereas eudaimonia proposes that striving to lead a meaningful life and achieve optimum functioning is the way to happiness (Aristotle, 2009; Diener, 2000; Ryan & Deci, 2001; Ryff, 1989). The two approaches have informed research into human well-being with different methods proposed for the study of well-being. Methods based on the study of 'subjective well-being' includes measures of positive affect, negative affect and life satisfaction, a mixture of both hedonic and eudaimonic well-being (Bradburn, 1969; Diener, 1984; Diener, 1994; Diener *et al.*, 1999). The study of 'psychological well-being' on the other hand measures only eudaimonic elements of life, such as self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth, leaving out the hedonic focus on pleasures (Ryff, 1989; Ryff, 1995; Ryff, 2014).

Though some aspects of volunteer well-being have been studied in depth, no previous studies have investigated volunteer managers' perceptions of the well-being of their volunteers. As volunteer managers are responsible for the well-being of their volunteers, and as improved volunteer well-being is often an important outcome for volunteers, organisations and society (O'Brien *et al.*, 2011), it is vital that managers' perceptions of the well-being of their volunteers correspond to actual volunteer well-being. The cumulative evidence from a broad range of studies (see meta-analyses and reviews in Jenkinson *et al.*, 2013; Musick & Wilson, 2008; Wilson, 2000; Wheeler *et al.*, 1998) is that volunteering has a positive relationship with a wide range of elements within the concept of well-being, though causation can be difficult to determine (Greenfield & Marks, 2004). Previous studies have investigated the effect of volunteering on subjective well-being (e.g. Binder & Freytag, 2013; Harlow & Cantor, 1996; Windsor *et al.*, 2008) or psychological well-being (e.g. Ho, 2015), or a combination of one of these along with other elements of well-being, such as social well-being, trust, self-esteem, depression or physical health (e.g. Greenfield & Marks, 2004; Koss & Kingsley, 2010; O'Brien *et al.*, 2010; Son & Wilson, 2012; Stukas *et al.*, 2016; Thoits & Hewitt, 2001; Townsend, 2006). Some studies show that volunteering leads to increased well-being (Borgonovi, 2008; Piliavin, 2009; Piliavin & Siegl, 2007), while other studies show that people higher in well-being are also more likely to volunteer (Gimenez-Nadal & Molina, 2015; Greenfield & Marks, 2004) and to volunteer more hours (Son & Wilson, 2012; Thoits & Hewitt, 2001). Most likely the causality runs both ways between volunteering and well-being (Binder & Freytag, 2013; Gimenez-Nadal & Molina, 2015) in a 'virtuous cycle' where happy and healthy people volunteer more and volunteers are happier and healthier (Brooks, 2007). Environmental volunteering could further enhance this virtuous cycle, as spending time in nature has been linked to increased well-being (Frumkin, 2001).

Environmental volunteer well-being

Only a few studies have focused specifically on the relationship between environmental volunteers and their well-being (e.g. Koss & Kingsley, 2010; O'Brien *et al.*, 2010; Townsend, 2006), as many studies have used cohort datasets where volunteering type was often heterogeneous or not described (Jenkinson *et al.*, 2013). Volunteering in nature has been linked to well-being benefits for volunteers, including improved social networks (Bell *et al.*, 2008; Gooch, 2005; Koss & Kingsley, 2010; Muirhead, 2011; O'Brien *et al.*, 2010), increased personal satisfaction and feelings of enjoyment (Koss & Kingsley, 2010; Muirhead, 2011), and improved health and well-being (Koss & Kingsley, 2010; O'Brien *et al.*, 2010; Pillemer *et al.*, 2010). Environmental volunteering can have a positive effect, not only by increasing positive indices of well-being, but also by reducing negative indices such as reducing stress (Guiney & Oberhauser, 2009; O'Brien *et al.*, 2010) and depression (Pillemer *et al.*, 2010). Furthermore, environmental volunteering offers the added benefit of providing opportunities for volunteers to spend time in nature, which can lead to a better connection or re-connection with nature for the volunteers (Bell *et al.*, 2008; Guiney & Oberhauser, 2009). It can also lead to volunteers gaining an increased understanding of the natural environment (Koss & Kingsley, 2010) and thereby also an enhanced sense of place (Evans *et al.*, 2005; Gooch, 2005). A closer connection to nature has been shown to enhance people's well-being (Bowler *et al.*, 2010; Kellert & Wilson, 1993), and therefore it could be expected that environmental volunteers would benefit more from their volunteering than other types of volunteers. Practical conservation volunteering requires

stamina and physical strength and it provides a way to exercise and gain improved fitness (Guiney & Oberhauser, 2009; O'Brien *et al.*, 2010), which can also reinforce positive well-being (Pretty *et al.*, 2005).

To better understand these relationships between volunteering and well-being, a more holistic and multidimensional approach to well-being, including both hedonic and eudaimonic elements, as well as social elements, would be well suited (Piliavin, 2009). Such a holistic approach to well-being is gaining acceptance (Forgeard *et al.*, 2011; Keyes, 2002; Ryan & Deci, 2001), and one proposed multidimensional model of well-being is Seligman's (2011) PERMA model. It is a construct with five contributing elements (PERMA): 1) 'Positive emotion', which encompass present positive feelings, life satisfaction and positive emotions about the future; 2) 'engagement', which is employing one's strengths to a task, becoming fully absorbed in the task and therefore completely losing track of time, also referred to as getting into 'flow' (Csikszentmihalyi, 1975; Csikszentmihalyi, 1991; Seligman, 2011); 3) 'positive relationships', which are fundamental to a good life according to Seligman (2011), and Baumeister & Leary (1995) have also defined it as a basic human need that is essential for well-being; 4) 'meaning', which includes feelings of doing something worthwhile and having a purpose and direction in life, something which is crucial to well-being as, according to Seligman (2011), most people have a need to belong to or serve something they believe is larger than themselves, e.g. their family, an organisation or a religious group; and 5) 'achievement', often pursued for its own sake by individuals setting their own personal goals or striving to achieve recognition in the wider world, e.g. winning an award or accumulating wealth. Seligman (2011) did not propose a measure for his PERMA model but Butler & Kern (2016) subsequently developed the PERMA-Profiler (PERMA-P), a scale based on the PERMA model, which also includes additional elements of well-being. The additional elements in the PERMA-P are 1) 'negative emotion' from the concept of subjective well-being acknowledging the importance of both positive and negative aspects of well-being; 2) 'health', which can be considered a core part of well-being; 3) 'loneliness', which is a strong predictor of many negative life outcomes; and 4) 'overall happiness', which allows an overall assessment after reflecting on specific elements of well-being (Butler & Kern, 2016).

Aims and research questions

This paper aims to use a multidimensional approach to well-being to explore the immediately experienced and later remembered well-being of environmental volunteers, as well as their general well-being and to compare this to the well-being of participants in other types of nature-based activities and volunteering. It also aims to compare volunteer managers' perception of their volunteers' well-being with the self-reported well-being of the volunteers. These aims were addressed through the following research questions: 1) How does environmental volunteering immediately affect participants' sense of well-being, and how does that compare to the immediate effect of other types of nature-based activities on participants' sense of well-being? 2) How well do volunteers sustain the memory of this immediately experienced sense of well-being after they have gone home? 3) How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers? 4) How does the volunteer managers' perception of volunteer well-being compare to volunteers' actual sense of volunteering-related well-being?

Methods

Well-being was investigated using a positive psychology approach based on the PERMA well-being theory proposed by Seligman (2011) and using the PERMA-Profiler (PERMA-P) developed by Butler & Kern (2016). The PERMA-P consists of the original five well-being elements proposed by Seligman, 'positive emotion' (P), 'engagement' (E), 'positive relationships' (R), 'meaning' (M) and 'achievement' (A), as well as 'negative emotion' and 'health', measured with three items each, and 'loneliness' and 'happiness', measured with a single item each. Three-item elements can be regarded as individual factors or elements, and the resulting PERMA-P seven-factor model of well-being can be tested through factor analysis with the 'overall happiness' and 'loneliness' items providing additional information (Butler & Kern, 2016). All items were scored on an 11-point (0–10) Likert scale (Likert, 1932). Following a pilot study (unpublished report, GK, RS, SC and AD), the wording of two items on the questionnaire was changed. The two words, 'loved' and 'angry', were seen by volunteers to be 'quite American' and badly fitted to a British volunteering context, and were therefore changed to 'appreciated' and 'frustrated', respectively. Data presented here are the complete subset of all items related to well-being in the questionnaires from a larger study, which also investigated volunteer motivation and activities (GK PhD research). Data were obtained from three sources: Study 1) an onsite survey of participants in nature-based activities (Dataset 1); Study 2) an online survey of former, current and potential volunteers (Dataset 2); and Study 3) an online survey of former and current volunteer managers (Dataset 3; Table 1).

The aim of Study 1 was to answer research question 1) How does environmental volunteering immediately affect participants' sense of well-being and how does that compare to the immediate effect of other types of nature-based activities on participants' sense of well-being? Combining data from Study 1 and Study 2 aimed to answer research question 2) How well do volunteers sustain the memory of this immediately experienced sense of well-being after they have gone home? The aim of Study 3 was to answer research question 3) How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers? And finally, combining data from all three studies aimed to answer research question 4) How does this volunteer manager perception of volunteer well-being compare to volunteers' actual sense of volunteering-related well-being?

Participants

Ethics. This research project was approved through the ethics approval process at Bournemouth University (ref ID 2419). All participants provided written informed consent for participation.

Study 1. The onsite study was conducted between October 2014 and November 2015 and involved participants from 13 organisations from Southern England, divided into four types of activities: Biodiversity monitoring, practical conservation volunteering, walking, and students conducting fieldwork as part of their university course (Table 2). Environmental organisations were invited to participate in the study based on them conducting volunteer activities in groups.

Table 1. Overview of the three studies, respondents and type of well-being measured.
Overview of the three studies in this research, including focus, respondents, subgroups and type of well-being measured. BM, biodiversity monitoring volunteers; Stud, Students conducting fieldwork as part of their university course; PC, practical conservation volunteers; Walk, walkers; BMPC, biodiversity monitoring volunteers also doing practical conservation.

Study 1: Onsite activity survey								
Respondents	Activity participants (volunteers, students and walkers)							
Focus	Before-activity				After-activity			
Type of well-being measured	Own general well-being				Own experienced activity-related well-being			
Respondent sub-groups	BM	Stud	PC	Walk	BM	Stud	PC	Walk
Study 2: Online volunteer survey								
Respondents	Volunteers							
Focus	Current				Former and potential			
Type of well-being measured	Own remembered activity-related well-being				Own general well-being			
Respondent sub-groups	BM	BMPC	PC	Other	BM	BMPC	PC	Other
Study 3: Online volunteer manager survey								
Respondents	Volunteer managers							
Focus	Former and current							
Type of well-being measured	Perceived volunteer well-being							
Respondent sub-groups	BM		BMPC		PC		Other	

Table 2. Respondents and descriptive statistics of groups in the onsite survey (Study 1).

Activity type	$n_{general\ well\text{-}being}$	$n_{activity\ well\text{-}being}$	Number of organisations	Number of sample dates	Group sizes (mean ±SD)	Hours of activity (mean ±SD)
Biodiversity monitoring	91	79	8	16	12.83 *(±6.16)*	3.71 *(±1.62)*
Students	123	109	3	6	39.20 *(±21.72)*	3.95 *(±1.20)*
Practical conservation	100	101	2	15	15.62 *(±9.52)*	4.57 *(±1.06)*
Walkers	73	62	2	10	23.70 *(±4.28)*	2.77 *(±0.79)*

Control groups were invited based on their group activity being conducted in the same natural environments as the volunteer activities of the environmental organisations. To determine if environmental volunteering had a different effect on well-being compared to other non-altruistic activities performed outdoors, students and walkers were surveyed in addition to environmental volunteers. Students were chosen as the control group to the biodiversity monitoring volunteers, as both groups were conducting ecological fieldwork in similar areas, but whereas volunteering is often seen as altruistic (Smith, 1981; Unger, 1991), students did the fieldwork because it was a requirement of their university courses. Walking groups were chosen as the control group for the practical conservation volunteers as both activities were performed outdoors in similar areas and were somewhat physically demanding, but the purpose of the activities were again different, with volunteering being partly altruistic and walking only benefitting the walkers themselves. Also, walking is the most popular activity in the natural environment in England (Natural England, 2015) and walking programmes are promoted as health interventions to decrease negative affect and mental illness and increase well-being in participants (Iwata *et al.*, 2016; Marselle *et al.*, 2014). The survey was designed as a paired before-activity and after-activity survey to measure general level of well-being and experienced level of well-being during an activity, respectively. Activity participants only completed

questionnaires once to ensure independent samples even if they participated in activities later where other activity participants completed questionnaires.

Studies 2 and 3. Both online surveys were open to anyone with the link between September and December 2015. Environmental organisations involved in study 1 as well as other worldwide environmental organisations and volunteer centres in the UK were contacted directly and asked to invite their volunteers and volunteer managers to participate and the surveys were also sent out more widely through professional networks. Study 2 investigated the general level of well-being of former and potential volunteers as well as the remembered level of well-being during volunteering of current volunteers. In Study 2, a total of 417 responses were received with completed questions about well-being. This sample comprised 53% females and 47% males. Age ranged from 18 to 94 years old (mean=54.86, *SD*=16.10). Most respondents had at least one university degree (65.23%) and many were retired (48.68%), some were in full-time (21.10%) or part-time (13.19%) employment and few were students (6.95%), not currently employed (5.28%) or homemakers (1.20%). Respondents were from 11 different countries, with the majority residing in the United Kingdom (88.49%). They named 118 different organisations they previously or currently volunteer for or would like to volunteer for in the future. Respondents included people from three different periods: former volunteers (18%), current volunteers (70%) and potential future volunteers (12%). They were grouped into four types of volunteers: biodiversity monitoring volunteers (BM; 21%), practical conservation volunteers (PC; 34%), biodiversity monitoring volunteers also performing practical conservation work (BMPC; 25%), and all other types of volunteers (19%) (Table 3).

Study 3 investigated the perceived level of well-being of volunteers by former and current volunteer managers. A total of 96 responses were received with completed questions about well-being. This sample comprised 61% females and 39% males. Age ranged from 19 to 74 years old (mean=43.01, *SD*=13.03). Most respondents had at least one university degree (80%) and most respondents were in full-time (69%) or part-time (13%) employment, few were retired (10%), students (2%), not currently employed (1%) or homemakers (1%). Respondents were from 10 different countries, with the majority residing in the United Kingdom (80%). Respondents included people from two different periods: former volunteer managers (14%) and current volunteer managers (86%), and they identified 62 different organisations they previously or currently manage volunteers for. They were grouped into four types of volunteering similarly to the volunteers in Study 2: BM (20%), PC (26%), BMPC (35%) and all other types of volunteering (19%) (Table 4).

Table 3. Type of volunteers and volunteer status of respondents to the online volunteer survey (Study 2). BMPC, biodiversity monitoring volunteers also performing practical conservation work (n=417).

Volunteer type	Former volunteers (%)	Current volunteers (%)	Potential volunteers (%)	*Total (%)*
Biodiversity monitoring	4.08	15.35	1.20	20.62
BMPC	3.84	17.27	4.32	25.42
Practical conservation volunteers	6.00	24.94	2.88	33.81
Other types of volunteers	4.08	12.47	2.40	18.94
Undisclosed			1.20	1.20
Total	*17.99*	*70.02*	*11.99*	*100.00*

Table 4. Type of volunteering and volunteer manager status of respondents (Study 3). BMPC, volunteer managers in biodiversity monitoring also performing practical conservation work (n=96).

Types of volunteering	Former managers (%)	Current managers (%)	*Total (%)*
Practical conservation	2.08	23.96	*26.04*
BMPC	9.38	26.04	*35.42*
Biodiversity monitoring		19.79	*19.79*
Other types of volunteering	2.08	16.67	*18.75*
Total	*13.54*	*86.46*	*100.00*

Data analyses

Deriving the well-being factors. The first step in exploring well-being was to test if the structures of self-reported well-being and managers' perception of volunteer well-being were consistent with the proposed seven-factor PERMA-Profiler (PERMA-P) model (Butler & Kern, 2016). This was done by performing exploratory factor analysis (EFA) on a subsample of self-reported well-being data to generate a best fit model. The generated model and the original seven-factor PERMA-P model were subsequently tested for best fit through confirmatory factor analysis (CFA) using the other subsample of collected data from participants, and the total combined sample. EFA was also performed on the volunteer manager data sample to generate a best fit model and confirmatory factor analysis was run on the generated model, the model generated from the self-reported subsample and the original seven-factor PERMA-P model to determine the best fit model.

Self-reported well-being: Only complete responses were used for factor analysis (n=1157) (Figure 1). The data were split in two subsamples to develop (n=645) and test (n=512) the factor model.

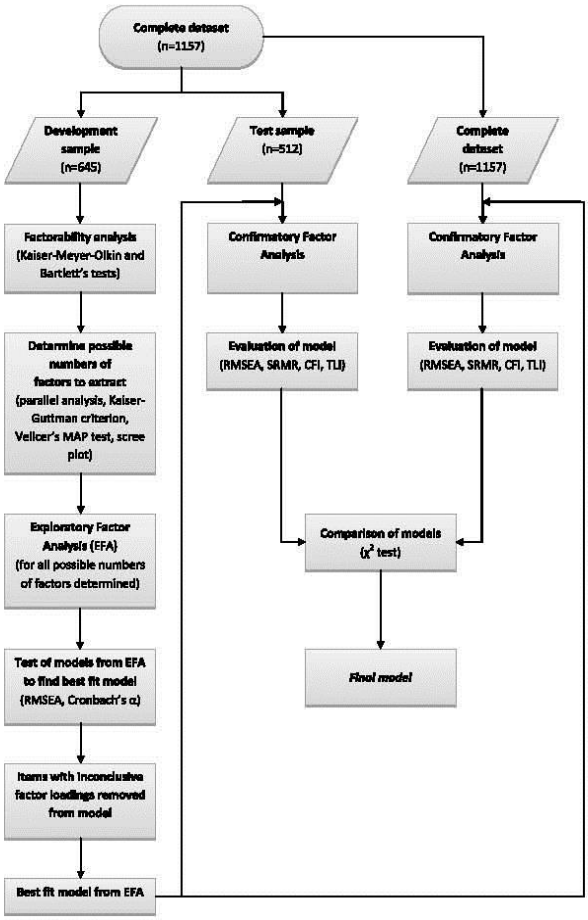

Figure 1. Analysis flowchart for determining the best fit model for self-reported well-being factors.

The development sample consisted of all onsite and online respondents to questionnaires measuring activity-related well-being, which included volunteers and control activity participants from Study 1 ('after-activity survey') and current volunteers from Study 2. The test sample consisted of all onsite and online respondents to questionnaires measuring general well-being which included volunteers and control activity participants from Study 1 ('before-activity survey') and former and potential volunteers from Study 2. The largest subsample was used as the development sample for the EFA.

The first step in determining the best fitting model was to test the factorability of the items in the development subsample with the Kaiser-Meyer-Olkin measure of sampling adequacy, recommended to be >0.60, and with Bartlett's test of sphericity, where significance indicates the data are suitable for factor analysis (Dziuban & Shirkey, 1974). The first step in EFA is to determine the number of factors to extract. There is no set formula for determining this number and it is determined by using a variety of methods and interpretation of the data (Matsunaga, 2010). Several methods were used to determine the number of factors to extract, including parallel analysis (Horn, 1965), the Kaiser-Guttman criterion (counting only Eigenvalues above one, Kaiser, 1960), Velicer's minimum average partial (MAP) test (Velicer, 1976) and visual inspection of the scree plot (Cattell, 1966). EFA using ordinary least squares to find the minimum residual (minres) solution with oblique (promax) rotation, which allows factors to be correlated, were performed for relevant models. To determine overall best fit model, results were evaluated using the root mean square error of approximation (RMSEA). RMSEA <0.05 indicate a good fit and between 0.05 and 0.08 indicate a fair fit (MacCallum *et al.*, 1996). Cronbach's α (Cronbach, 1951) was calculated for each factor to test internal reliability of factors. Cronbach's α values >0.70 are considered acceptable (Nunnally, 1978), though for scales with 6 or fewer items lower α values may be acceptable (Cortina, 1993). Items with factor loadings <0.04 or loading on two factors with the difference between primary and secondary loadings <0.03 were removed from the dataset before further analyses, a suggested way of dealing with inconclusive factor loadings (Matsunaga, 2010). The best factor model was determined by choosing the model with optimal model fit indices, high internal reliability of factors and best interpretability of the data. CFA is a method to test if a certain predetermined model is a good fit for a data sample. CFA was performed for the best fit model developed from the EFA, the original seven-factor PERMA-P model and a generic one-dimensional control model using the test sample and the combined development and test sample. Model fits were evaluated using RMSEA, the standardised root mean residual (SRMR), comparative fit index (CFI) and the Tucker Lewis Index (TLI), and models were compared for best fit using χ^2 difference tests. SRMR below 0.08 is considered a good fit, and TLI and CFI values >0.90 are considered acceptable and close to or above 0.95 are considered good fits (Hu & Bentler, 1999).

Volunteer managers' perception of volunteers' well-being: Only complete responses from former and current volunteer managers were used for factor analysis (n=96) (Figure 2). Due to the limited sample size, it was not possible to split the data into a development and a test sample, as sample size should be at least 100–200 per subsample to perform the analysis (MacCallum *et al.*, 1996). EFA was performed on the complete sample, following the method described above, including testing factorability of items, determining number of factors to extract and using oblique (promax) rotation for the EFA. The best fit model was determined also following the described method above by evaluating RMSEA, interpretability and Cronbach's α. Items with inconclusive factor loadings were removed. CFA was then performed on the volunteer manager data sample using the best-fitting model from the EFA, the model developed from the self-reported well-being sample EFA described above, the original seven-factor PERMA-P model and a one-dimensional control model. Model fit for all models were evaluated using RMSEA, SRMR, CFI and TLI, and models were compared for best fit using χ^2 difference tests.

Influence of volunteering type and other variables on well-being scores. As data were non-normally distributed, non-parametric tests were used in all analyses. As samples in the onsite survey (Study 1) had subject replication, Wilcoxon signed-rank tests were used to test for differences in the level of general well-being and level of activity-related well-being within the four groups of activity participants. For all other comparisons without subject replication, Wilcoxon rank sum tests were used to test for differences in levels between general and activity-related well-being. Kruskal-Wallis tests with post hoc Dunn's test with Bonferroni correction were used to identify significantly different levels of actual and perceived well-being between the four different types of volunteers (Studies 2 and 3) and between managers in the four different types of volunteering (Study 3), respectively.

Stepwise multiple regression was performed to examine if there were any effects of external variables on overall mean well-being, calculated as the mean of all well-being items (23 items) with negative items, i.e. negative emotions and loneliness, reverse scored. Variables included in Study 1 were volunteer frequency, tenure and hours per month volunteered, and specific variables on the day: weather, group size, hours volunteered, volunteer manager experience and type of volunteering. In Study 2, variables included were volunteering type, as well as demographic variables (age, gender, education, country). Variables included in Study 3 were volunteering type, period and manager tenure, as well as demographic variables (age, gender, education, country).

Statistical analysis. All statistical analyses were completed using RStudio v3.2.3 (RStudio Team, 2015). The nFactor package v.2.3.3 (Raiche, 2010), psych package v.1.5.8 (Revelle, 2016) and the GPArotation package v.2014.11-1 (Bernaards & Jennrich, 2005) were used for exploratory factor analysis, the lavaan package v.0.5-20 for R was used for confirmatory factor analysis (Rosseel, 2012) and the ggplot2 package v.2.0.0 was used to create graphs (Wickham, 2009).

Results

Studies 1 and 2: Immediate and remembered effects of environmental volunteering, other nature-based activities and other types of volunteering

Deriving the self-reported well-being factors. Factorability of the items in the development sample was supported by a Kaiser-Meyer-Olkin measure of 0.94 and a significant Bartlett's test of sphericity ($\chi^2(210)=8448.17$; $p<0.001$), indicating the data were

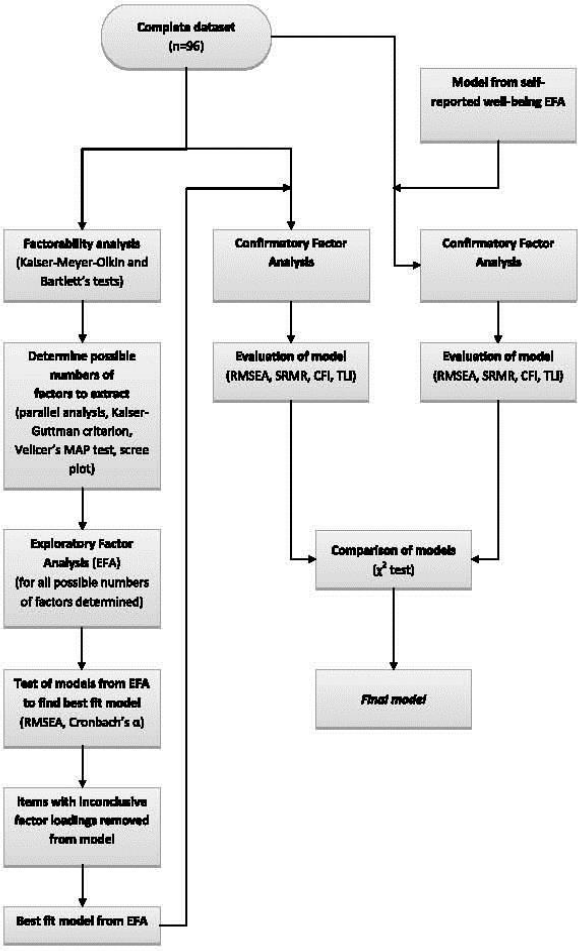

Figure 2. Analysis flowchart for determining best fit model of perceived volunteer well-being factors by volunteer managers.

fit for factor analysis. The number of factors to extract was determined by evaluating several factor extraction results: parallel analysis suggested six factors, the Kaiser-Guttman criteria suggested four factors, Velicer's minimum average partial test identified three factors and visual inspection of the scree plot suggested between two and five factors. Three-, four-, five- and six-factor models were evaluated through exploratory factor analysis and Cronbach's α for individual factors for each model were also evaluated. The five-factor model provided the clearest structure with a good fit (RMSEA = 0.056 [90% confidence interval = 0.048, 0.062]). Five of the seven factors could be interpreted as factors from the PERMA-P (Table 5): 'Engagement' (four items, $\alpha = 0.79$), 'relationships' (three items, $\alpha = 0.77$), 'meaning' (two items, $\alpha = 0.88$), 'negative emotions' (three items, $\alpha = 0.64$) and 'health' (three items, $\alpha = 0.92$). One 'positive emotion' item, 'In general, how often do you feel joyful?', loaded on the 'engagement' factor. One 'achievement' item, 'How often do you achieve the important goals you have set for yourself?' loaded on the 'meaning' factor, but was dropped

Table 5. Five well-being factors resulting from exploratory factor analysis of the development sample. The five well-being factors resulting from exploratory factor analysis of the development sample. Cronbach's α for each factor and items with factor loadings (only loadings <-0.30 or >0.30). Greyed out items were excluded from the final model due to inconclusive factor loadings, and were not included in the confirmatory factor analysis. One item was dropped to improve internal reliability of factor (n=645).

		Engagement	Relationship	Meaning	Negative	Health
Cronbach's α		***0.79***	***0.77***	***0.88***	***0.64***	***0.92***
Item	**Original PERMA-P factor**					
How often do you become absorbed in what you are doing?	Engagement	**0.84**				
In general, how often do you feel joyful?	Positive emotion	**0.84**				
In general, to what extent do you feel excited and interested in things?	Engagement	**0.65**				
How often do you lose track of time while doing something you enjoy?	Engagement	**0.54**				
In general, how often do you feel positive?	Positive emotion	0.46				
How much of the time do you feel you are making progress towards accomplishing your goals?	Achievement	0.42		0.36		
To what extent do you feel appreciated?	Relationship		**1.06**			
How satisfied are you with your personal relationships?	Relationship		**0.86**			
To what extent do you receive help and support from others when you need it?	Relationship		**0.53**			
In general, to what extent do you feel contented?	Positive emotion		0.47			
To what extent do you generally feel you have a sense of direction in your life?	Meaning		0.40	0.38		
In general, to what extent do you lead a purposeful and meaningful life?	Meaning			**0.99**		
In general, to what extent do you feel that what you do in your life is valuable and worthwhile?	Meaning			**0.69**		
How often do you achieve the important goals you have set for yourself?[1]	Achievement			0.56		
How often do you feel frustrated?	Negative emotion				**0.66**	
How often do you feel sad?	Negative emotion				**0.63**	
How often do you feel anxious?	Negative emotion				**0.64**	
How satisfied are you with your current physical health?	Health					**0.99**
In general, how would you say your health is?	Health					**0.88**
Compared to others of your same age and sex, how is your health?	Health					**0.89**
How often are you able to handle your responsibilities?	Achievement					

to substantially improve internal reliability of factor and overall model fit. Five items failed to load conclusively on any one factor and were left out of the subsequent confirmatory factor analysis.

CFA was run on the test sample and the combined development and test sample with the five-factor model developed from the EFA. Model fit was acceptable for the test sample based on all fit indices (RMSEA (0.076 [0.067; 0.085]), SRMR (0.066), CFI (0.938) and TLI (0.918)). Model fit was good for the combined development and test sample based on SRMR (0.055), CFI (0.955) and TLI (0.940) indices and was acceptable based on RMSEA (0.069 [0.064; 0.075]). The five-factor model from the EFA fitted the test sample significantly better than the original seven-factor PERMA-P model ($\Delta\chi^2(88) = 530$; $p<0.001$) or a generic one-factor model ($\Delta\chi^2(109) = 1565$; $p<0.001$). The five-factor model also fitted the combined development and test sample significantly better than the original seven-factor PERMA-P model ($\Delta\chi^2(88) = 788$; $p<0.001$) or a generic one-factor model ($\Delta\chi^2(109) = 3717$; $p<0.001$). Factor correlations based on the combined test and development sample are summarised in Table 6, and show that all factors were significantly correlated.

External factors and volunteer well-being. Volunteers spending more hours volunteering per month, and for Study 2 also spending more time volunteering outdoors, reported higher levels of overall well-being. For volunteers in Study 1, this result came from stepwise multiple regression, which reduced the model for predicting the overall mean volunteering-related well-being score to only include the number of hours spent volunteering per month as a significant factor ($F_{1,164} = 5.55$; $p<0.05$; $R^2 = 0.03$). For the current volunteers in Study 2, stepwise multiple regression reduced the model for predicting the overall mean volunteering-related well-being score to include the number of hours spent volunteering per month ($p<0.001$) and the amount of time spent outdoors while volunteering ($p<0.001$) as significant factors ($F_{2,225} = 11.69$; $p<0.001$; $R^2_{adj} = 0.09$). The number of hours spent volunteering per month ($r=0.22$; $p<0.001$) and the amount of time spent outdoors while volunteering ($r=0.21$; $p<0.01$) were both significantly positively correlated with the overall mean volunteering-related well-being score.

Study 1: How does environmental volunteering immediately affect well-being? Mean scores were calculated for each well-being element for both general well-being and activity-related well-being in the four participating groups: Biodiversity monitoring volunteers, practical conservation volunteers, students and walkers (Table 7). All groups rated most of their activity-related well-being significantly better than their general well-being with the positive indices, 'engagement', 'relationship', 'meaning', 'health' and 'happiness', rated significantly higher and the negative indices, 'negative emotions' and 'loneliness', rated significantly lower for activity-related well-being than for general well-being (Wilcoxon signed-rank test; $p<0.05$ for all; Figure 3). The only exceptions were students' rating of 'meaning', which was not significantly different between generally in life and during their fieldwork, and their rating of 'engagement', which was significantly lower for activity-related well-being than generally in life.

Comparing biodiversity monitoring volunteers to their student control group for general well-being there was one significant difference, as volunteers rated their 'health' significantly higher than students did (Wilcoxon rank sum test; $p<0.05$; Figure 4). Volunteers also rated their 'negative emotions' slightly lower than students did (Wilcoxon rank sum test; $p<0.06$). When comparing their activity-related well-being, however, there were significant differences in all elements of well-being, except 'loneliness', as volunteers consistently rated positive indices significantly higher and 'negative emotions' significantly lower than students did (Wilcoxon rank sum tests; $p<0.01$ for all).

Comparing practical conservation volunteers to their walker control group for their general level of well-being there was one significant difference, as volunteers rated 'relationships' significantly higher than walkers did (Wilcoxon rank sum test; $p<0.01$; Figure 5). This difference in 'relationship' ratings was even more significant when comparing their activity-related well-being (Wilcoxon rank sum test; $p<0.001$). Also negative indices showed differences in activity-related well-being with volunteers rating their 'negative emotions' significantly lower than walkers (Wilcoxon rank sum test; $p<0.05$) and rating their 'loneliness' lower than walkers.

Comparing the two different types of environmental volunteers, the biodiversity monitoring volunteers and the practical conservation volunteers, there were no significant differences in their levels of general (Wilcoxon rank sum tests; $p>0.07$ for all) or

Table 6. Final well-being factors, descriptive statistics and correlations for the combined development and test participant sample. Final well-being factors, descriptive statistics and correlations for the combined development and test participant sample showing significant correlations between all factors (n=1157; **p<0.001).

Variable	Mean	SD	Engagement	Relationship	Meaning	Negative
Engagement	7.34	1.53	1.00			
Relationship	7.55	1.74	0.52**	1.00		
Meaning	7.73	1.74	0.66**	0.63**	1.00	
Negative	2.77	2.22	-0.20**	-0.45**	-0.39**	1.00
Health	7.47	1.75	0.40**	0.44**	0.50**	-0.35**

Table 7. Means (SD) for well-being elements for all groups of participants and all types of well-being. BM, biodiversity monitoring volunteers; PC, practical conservation volunteers; BMPC, biodiversity monitoring volunteers also doing practical conservation.

		Study 1 (onsite, paired observations)		Study 2 (online, unpaired observations)		Study 3 (online, managers)
Well-being element	**Group**	**General well-being**	**Experienced activity-related well-being**	**General well-being**	**Remembered volunteer-related well-being**	**Perceived volunteer well-being**
Engagement						
	Students	7.32 (1.12)	6.21 (1.98)			
	Walkers	7.13 (1.29)	7.51 (1.47)			
	BM	7.25 (1.45)	7.83 (1.32)	7.33 (1.56)	7.14 (1.74)	7.50 (1.27)
	PC	7.34 (1.33)	7.69 (1.52)	7.61 (1.33)	7.53 (1.46)	7.73 (1.10)
	BMPC			7.21 (1.59)	7.97 (1.15)	7.64 (1.22)
	Other			7.46 (1.20)	7.61 (1.49)	7.07 (1.85)
Relationship						
	Students	6.88 (1.59)	7.63 (1.50)			
	Walkers	6.36 (1.80)	7.18 (1.87)			
	BM	7.14 (1.58)	8.61 (1.31)	7.11 (2.17)	7.40 (1.64)	7.79 (1.34)
	PC	7.07 (1.75)	8.52 (1.30)	7.11 (2.19)	8.02 (1.35)	8.25 (0.83)
	BMPC			7.49 (1.64)	8.25 (1.59)	8.06 (1.35)
	Other			7.53 (1.78)	8.34 (1.47)	7.89 (1.77)
Meaning						
	Students	6.87 (1.73)	7.06 (2.02)			
	Walkers	7.14 (1.62)	8.31 (1.44)			
	BM	7.20 (1.48)	8.48 (1.27)	7.86 (1.37)	8.07 (1.34)	8.11 (1.08)
	PC	7.18 (1.76)	8.53 (1.58)	7.31 (1.96)	8.18 (1.51)	8.38 (1.04)
	BMPC			7.47 (1.86)	8.55 (1.11)	8.47 (1.25)
	Other			7.72 (1.75)	8.72 (1.45)	8.67 (1.04)
Health						
	Students	6.77 (1.52)	7.31 (1.73)			
	Walkers	7.55 (1.55)	8.06 (1.57)			
	BM	7.19 (1.84)	7.90 (1.89)	6.97 (1.90)	7.37 (1.57)	6.42 (1.63)
	PC	7.72 (1.59)	8.14 (1.52)	7.36 (2.40)	8.00 (1.62)	6.80 (1.81)
	BMPC			7.72 (1.92)	7.81 (1.89)	7.06 (1.80)
	Other			7.10 (1.83)	7.69 (1.92)	5.33 (2.43)
Negative						
	Students	4.55 (1.74)	1.81 (1.74)			
	Walkers	4.43 (2.05)	1.65 (1.71)			
	BM	4.08 (1.80)	1.24 (1.76)	4.17 (2.19)	1.86 (1.66)	2.33 (1.27)
	PC	4.07 (2.10)	1.00 (1.21)	3.75 (1.93)	1.62 (1.36)	2.69 (1.09)
	BMPC			3.94 (2.33)	1.84 (1.78)	2.63 (1.63)
	Other			3.91 (2.26)	2.41 (1.62)	3.72 (2.00)
Lonely						
	Students	3.37 (2.60)	1.07 (2.00)			
	Walkers	3.89 (2.87)	1.63 (2.68)			
	BM	3.54 (2.83)	0.77 (1.88)	3.41 (3.21)	1.11 (1.95)	1.53 (1.82)
	PC	3.66 (3.08)	0.65 (1.41)	2.92 (3.17)	0.96 (1.68)	2.08 (1.60)
	BMPC			3.24 (2.98)	1.17 (2.24)	1.94 (2.20)
	Other			2.41 (2.87)	1.27 (2.04)	1.72 (1.97)
Happy						
	Students	7.06 (1.56)	7.39 (2.10)			
	Walkers	7.12 (1.66)	8.52 (1.48)			
	BM	7.34 (1.50)	8.57 (1.21)	7.32 (2.20)	7.98 (1.67)	7.89 (1.25)
	PC	7.42 (1.75)	8.61 (1.52)	7.62 (1.94)	8.54 (1.29)	8.36 (0.93)
	BMPC			7.47 (2.06)	8.51 (1.46)	8.09 (1.79)
	Other			7.74 (1.73)	8.54 (1.70)	7.50 (2.11)

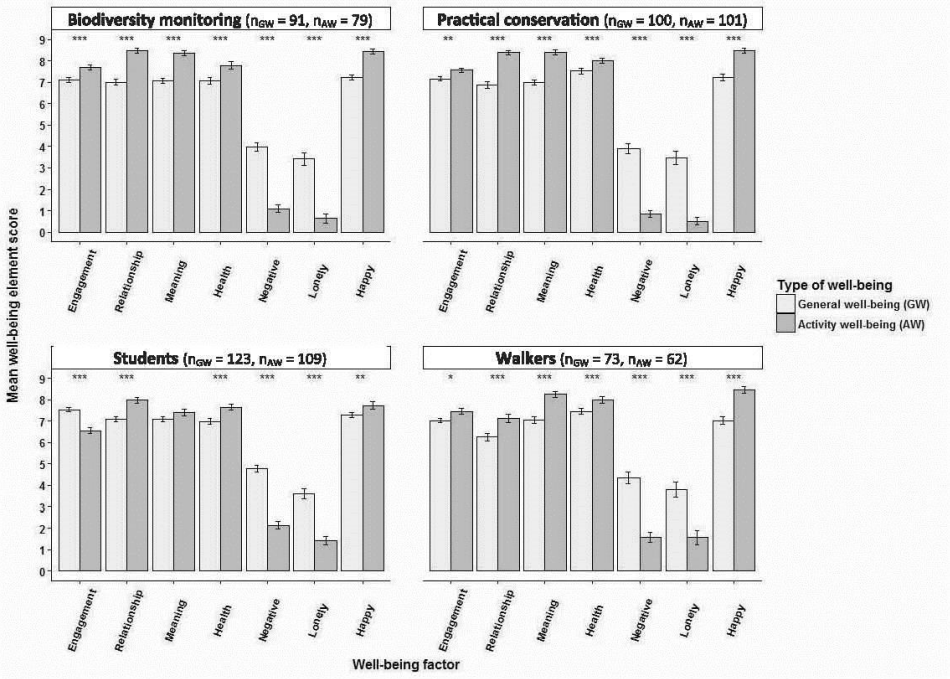

Figure 3. Differences between paired general well-being scores and activity well-being scores of participants in nature-based activities. Differences between paired general well-being scores (light grey) and activity well-being scores (dark grey) for biodiversity monitoring volunteers, practical conservation volunteers, students and walkers (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures (Wilcoxon signed-rank tests;*p< 0.05, **p<0.01, ***p<0.001).

activity-related (Wilcoxon rank sum tests; p>0.30 for all) well-being, suggesting that irrespective of the type of environmental volunteering performed, the effect on well-being is equally positive.

Dataset 1. Raw data from study 1, the onsite nature-based activity survey

http://dx.doi.org/10.5256/f1000research.10016.d142072

The raw data from onsite questionnaires of environmental volunteers and their control groups (walkers and students) supporting the findings described in the paper are provided.

Study 2: How well do volunteers sustain the memory of the immediately experienced sense of well-being after they have gone home? In the online survey, current volunteers were asked to remember the last time they volunteered and rate how they felt during that time. The 'relationship' (Kruskal-Wallis test; $\chi^2(3) = 16.18$; $p<0.01$), 'meaning' (Kruskal-Wallis test; $\chi^2(3) = 11.69$; $p<0.01$) and 'negative emotion' (Kruskal-Wallis test; $\chi^2(3) = 9.43$; $p<0.05$) elements showed significant differences between different types of volunteers (Table 7 and Figure 6). Biodiversity monitoring volunteers consistently rated positive indices lower than any other types of volunteers, and significantly so the 'relationship' element compared to biodiversity monitoring volunteers also doing practical conservation work (Dunn's test; $z = -3.44$; $p<0.01$) and non-environmental volunteers (Dunn's test; $z = -3.46$; $p<0.01$), and the 'meaning' element compared to non-environmental volunteers (Dunn's test; $z = -3.12$; $p<0.01$). Also practical conservation volunteers rated 'meaning' significantly lower than non-environmental volunteers (Dunn's test; $z = 2.67$; $p<0.05$). For 'negative emotions', however, both practical conservation volunteers (Dunn's test; $z = 2.95$; $p<0.01$) and biodiversity monitoring volunteers also doing practical conservation (Dunn's test; $z = -2.48$; $p<0.05$) rated them significantly lower than non-environmental volunteers.

Comparison of volunteers' experienced well-being just after volunteering ended (Study 1), their remembered volunteering-related well-being up to 12 months after volunteering (Study 2) and their

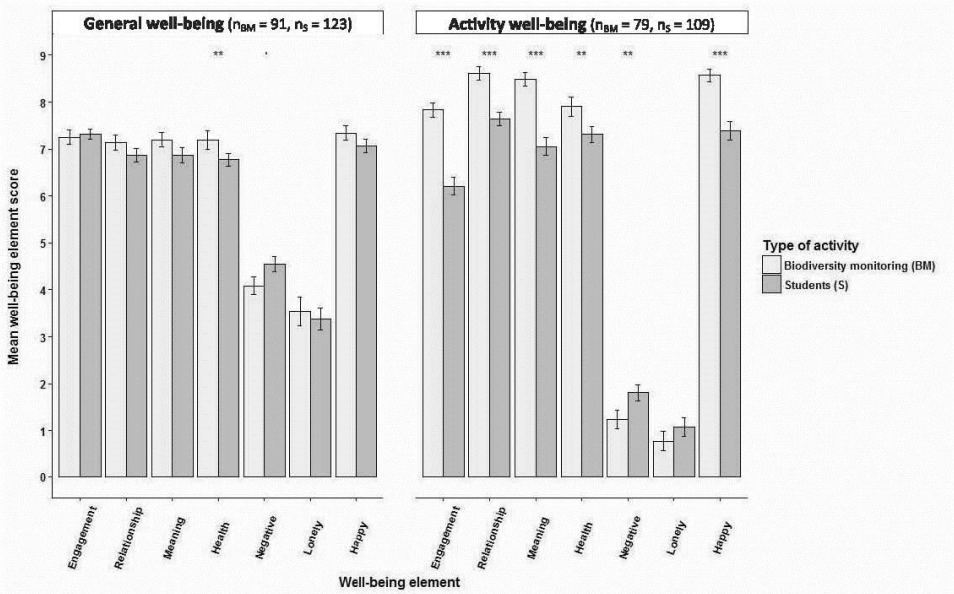

Figure 4. Differences between biodiversity monitoring volunteers and students in their level of general and activity well-being. Differences between biodiversity monitoring volunteers (BM) and students (S) in their level of general well-being (light grey) and activity well-being (dark grey) (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures (Wilcoxon rank sum test; ·p<0.06, *p<0.05, ***p<0.001).

general level of well-being in life (paired data from Study 1) showed that biodiversity monitoring volunteers consistently rated experienced positive indices significantly higher than their well-being generally in life (Kruskal-Wallis with post-hoc Dunn's tests; $p<0.01$ for all); remembered well-being was rated intermediate and significantly different from immediately experienced well-being for 'engagement', 'relationship' and 'health' (Kruskal-Wallis with post-hoc Dunn's tests; $p<0.01$) and significantly different from well-being generally in life for 'meaning' and 'happiness' (Kruskal-Wallis with post-hoc Dunn's tests; $p<0.01$; Table 7; Figure 7). Practical conservation volunteers showed the same trend and also rated their experienced 'relationship', 'meaning' and 'happiness' significantly higher just after volunteering and when later remembering it compared to generally in life (Kruskal-Wallis with post-hoc Dunn's tests; $p<0.001$). Both types of volunteers rated 'negative emotions' significantly lower just after volunteering and when remembering later than generally in life (Kruskal-Wallis with post-hoc Dunn's tests; $p<0.001$ for all).

There was no effect of time since current volunteers last volunteered within the last six months on their well-being ratings (Study 2, n=277; Kruskal-Wallis; $p>0.05$ for all). Comparing the baseline general well-being of volunteers from Study 1 (n=191) and non-volunteers, defined as people not having volunteered for at least 6 months, from Study 2 (n=51), there were no significant differences in ratings for any well-being elements (Wilcoxon rank sum tests; $p>0.05$ for all).

Dataset 2. Raw data from study 2, the online volunteer survey

http://dx.doi.org/10.5256/f1000research.10016.d142073

The raw data from online questionnaires of current, former and potential volunteers supporting the findings described in the paper are provided.

Study 3: How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers?

Deriving the perceived well-being factors. Exploratory factor analysis performed on the volunteer manager data identified a four-factor model; however, fit indices indicated only marginal fit (RMSEA = 0.09 [90% CI = 0.053; 0.102], TLI = 0.91). CFA based on the four-factor model revealed bad fit (RMSEA = 0.111 [90% CI = 0.089, 0.133], SRMR = 0.097, CFI = 0.880, TLI = 0.850). CFA based on the model from the self-reported well-being

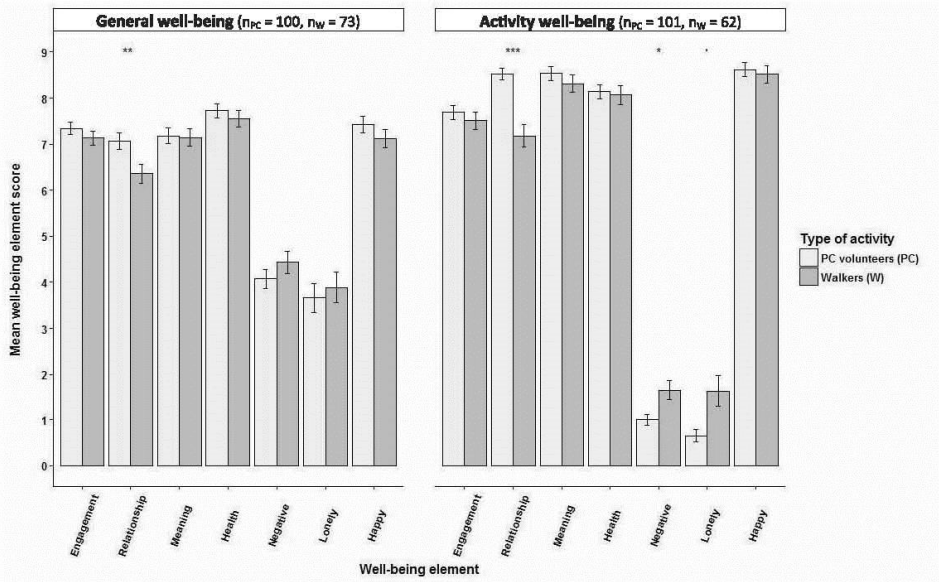

Figure 5. Differences between practical conservation volunteers and walkers in their level of general and activity well-being. Differences between practical conservation volunteers (PC) and walkers (W) in their level of general well-being (light grey) and activity well-being (dark grey) (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures (Wilcoxon rank sum tests; · p<0.06, *p<0.05, **p<0.01, ***p<0.001).

sample, but excluding the 'health' factor as there was only one item on health in the volunteer manager questionnaire, indicated acceptable fit based on CFI (0.929), TLI (0.902) and SRMR (0.066), though RMSEA (0.100 [90% CI = 0.069, 0.130]) was high. The four-factor model from the self-reported well-being sample had significantly better fit than the model developed from the volunteer manager EFA ($\Delta\chi^2(36) = 90$; $p<0.001$), the original PERMA-P model (without the 'health' factor) ($\Delta\chi^2(72) = 223$, $p<0.001$) or a generic one-factor model ($\Delta\chi^2(6) = 146$; $p<0.001$) and it was therefore used for exploring perceived well-being further. Factor correlations based on the volunteer manager sample are summarised in Table 8.

External factors and perceived well-being. Stepwise multiple regression reduced the model for predicting the overall mean perceived well-being score to only include the significant variable of manager time spent with volunteers (measured on 1–6 scale, 6 being 100%; $p<0.05$) and the important variable of managers' level of education (measured on 1–6 scale, 6 being doctoral degree; $p<0.07$) as important factors ($F_{2,91} = 4.93$; $R^2_{adj} = 0.08$; $p<0.01$). Manager time spent with volunteers was significantly positively correlated with the overall mean perceived well-being score, as well as with the perceived 'engagement', 'relationship' and 'meaning' elements (Table 8).

How do volunteer managers perceive the effect of volunteering on the well-being of their volunteers? Volunteer managers in different types of volunteering rated the well-being of their volunteers similarly, except for 'health' where managers in biodiversity monitoring also doing practical conservation rated their volunteers' 'health' higher than managers in non-environmental volunteering (Dunn's test; $z = 2.69$; $p<0.05$) (Figure 8).

Dataset 3. Raw data from study 3, the online volunteer manager survey

http://dx.doi.org/10.5256/f1000research.10016.d142074

The raw data from online questionnaires of current and former volunteer managers supporting the findings described in the paper are provided.

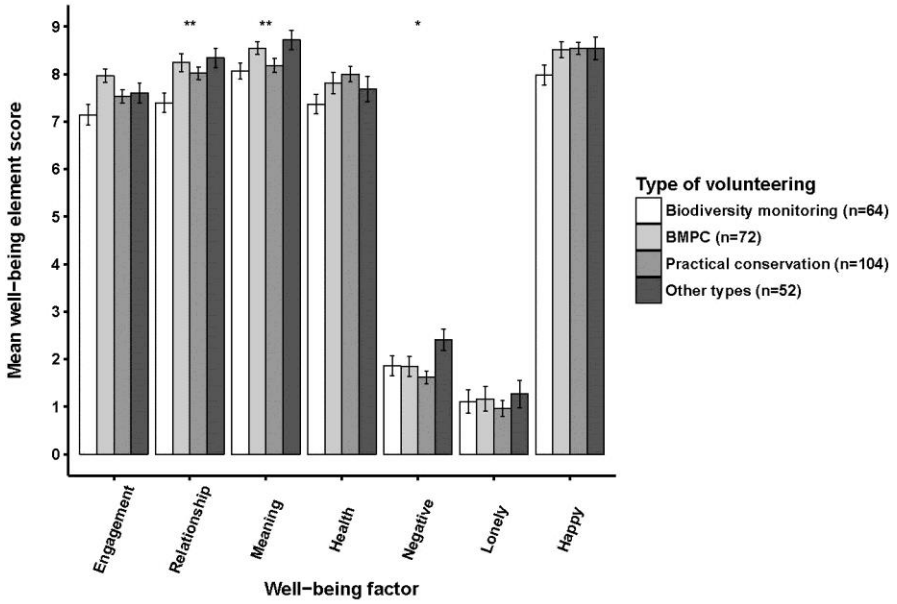

Figure 6. Remembered volunteering-related well-being of different types of current volunteers. The remembered volunteering-related well-being of different types of current volunteers (±SE bars) with significant differences found for 'relationship', 'meaning' and 'negative emotions' (Kruskal-Wallis tests; $p<0.05$, $^{**}p<0.01$). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures. BMPC, biodiversity monitoring volunteers also doing practical conservation work.

Studies 1, 2 and 3: How do volunteer manager perceptions of volunteer well-being compare to volunteers' actual sense of volunteering-related well-being?

Volunteer managers' perception of their volunteers' well-being corresponded to how volunteers felt just after volunteering ended ('experienced well-being') for 'engagement' and 'meaning' elements of well-being but significantly differed for 'health', 'negative emotions' and 'loneliness' in both biodiversity monitoring and practical conservation volunteering (Figure 9). Volunteer managers perceived their volunteers as significantly less healthy (Wilcoxon rank sum tests; $p<0.001$) and as having more 'negative emotions' (Wilcoxon rank sum tests; $p<0.001$) and feeling more 'lonely' (Wilcoxon rank sum tests; $p<0.01$) than was the experience of the volunteers. Managers in biodiversity monitoring also perceived volunteers' 'relationship' and 'happiness' elements significantly lower than volunteers reported they felt (Wilcoxon rank sum tests; $p<0.05$).

When volunteer managers' perception of the well-being of their volunteers was compared to how volunteers later rated their remembered volunteering-related well-being, there was still a significant difference in all types of volunteering with managers rating their volunteers' 'health' lower than the volunteers (Wilcoxon rank sum tests; $p<0.05$; Figure 10). Managers rated volunteers' perceived 'negative emotions' significantly higher than volunteers did in all types of volunteering (Wilcoxon rank sum tests; $p<0.05$), except biodiversity monitoring. Managers also rated volunteers' perceived 'loneliness' significantly higher in both practical conservation and biodiversity monitoring also doing practical conservation volunteering than volunteers (Wilcoxon rank sum tests; $p<0.01$). In non-environmental volunteering, managers rated volunteers' perceived 'happiness' significantly lower than volunteers (Wilcoxon rank sum test; $p<0.05$).

Discussion

Overall, and supporting previous research, volunteering increased participants' immediate sense of well-being, both by increasing positive elements and by decreasing negative emotions and loneliness, and it did so more than other types of nature-based activities. Remembering the volunteer experience later on, volunteers

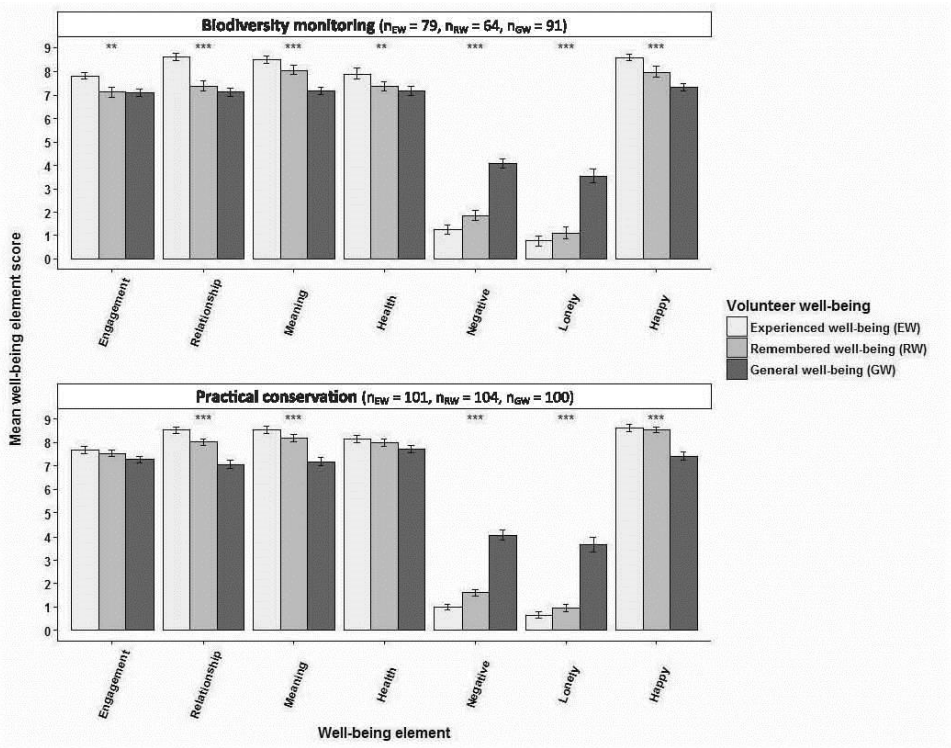

Figure 7. **Experienced, remembered and general well-being of environmental volunteers.** Experienced well-being just after volunteering ended and remembered volunteering-related well-being up to six months after volunteering compared to volunteers' general level of well-being in life for volunteers in biodiversity monitoring and practical conservation volunteering (±SE bars; Kruskal-Wallis tests; *p<0.05, **p<0.01, ***p<0.001).

Table 8. **Final well-being factors, descriptive statistics and correlations for volunteer manager sample.** Final well-being factors ('engagement', 'relationship', 'meaning', 'negative emotion', 0–10 scale), descriptive statistics and correlations for volunteer manager sample (n=94–96, * p<0.05, **p<0.001). MV Time, manager time spent with volunteers (1–6 scale, 6 being 100%); MPS, mean perceived well-being score from all items; Education, 1–6 scale, 6 being doctorate degree.

Variable	Mean	SD	MV Time	Education	MPS	Engagement	Relationship	Meaning
MV Time	2.66	1.23	1.00					
Education	4.10	1.14	-0.20	1.00				
MPS	7.65	1.01	0.25*	-0.20	1.00			
Engagement	7.53	1.37	0.21*	-0.16	0.81**	1.00		
Relationship	8.02	1.35	0.22*	-0.19	0.86**	0.59**	1.00	
Meaning	8.41	1.15	0.22*	-0.12	0.70**	0.56**	0.67**	1.00
Negative	2.79	1.60	-0.06	0.07	-0.54**	-0.19	-0.37**	-0.08

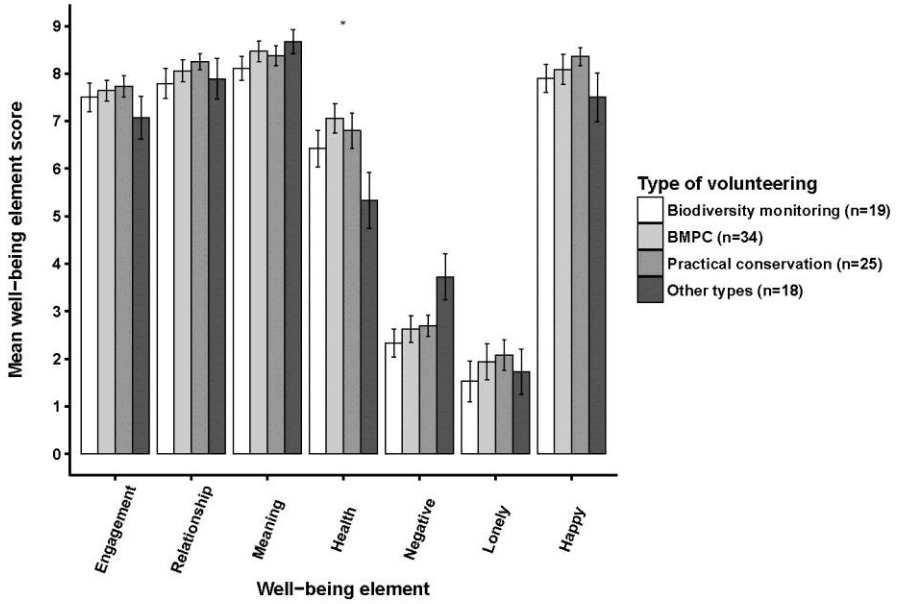

Figure 8. **Volunteer managers' perception of the well-being of their volunteers.** The perceived well-being of volunteers by different types of volunteer managers (mean score ±SE bars). Significant difference found only for Health (Kruskal-Wallis test; $\chi 2(3) = 7.63$; *p=0.05). 'Engagement', 'relationship', 'meaning' and 'negative emotion' factor scores were means of factor item aggregates. 'Health', 'loneliness' and 'happiness' were single item measures. BMPC, biodiversity monitoring volunteers also doing practical conservation work.

retained the feeling of a meaningful event with low levels of negative emotions and loneliness, though other positive feelings of engagement or positive relationships were not retained. Contrary to previous research, this study found that volunteering did not increase volunteers' general level of well-being when compared to non-volunteers' general level of well-being. Volunteer managers did perceive the increase in the positive elements of their volunteers' well-being during volunteering but did not perceive the significant decrease in negative emotions and loneliness their volunteers reported. This section will further discuss these points.

How nature-based activities immediately affects participants' sense of well-being

All nature-based activities examined in this research had a significant positive effect on some or all elements of participants' well-being, a result that agrees with previous studies (Iwata *et al.*, 2016; Koss & Kingsley, 2010; O'Brien *et al.*, 2010; Wyles *et al.*, 2016). However, contrary to many published studies that found volunteers had higher levels of well-being generally in life than non-volunteers (e.g. Greenfield & Marks, 2004; Harlow & Cantor, 1996; Konrath *et al.*, 2012), this study found no significant difference between volunteers and non-volunteers in their general level of well-being. For the online sample in Study 2, reasons for this could be the relatively small sample size for non-volunteers (n=51) and a potential selection bias (Ahern, 2005) in survey participation, as non-volunteers were not a random sample of people not volunteering, but rather people showing an interest in volunteering, either as former volunteers or potential future volunteers. However, findings in Study 1 were similar to Study 2 though students and walkers did not participate in this survey due to an interest in volunteering, suggesting it was not only a case of selection bias or small sample size.

The finding in the current study that volunteers who spend more time volunteering report higher immediate and remembered well-being supports previous studies (Binder & Freytag, 2013; Thoits & Hewitt, 2001). One study has suggested that between 100 and 800 volunteer hours per year provided the highest rates of well-being (Windsor *et al.*, 2008). However, other studies have found that the benefits of volunteering over 100 hours per year either led to no further benefits (Morrow-Howell *et al.*, 2003) or led to decreased benefits and satisfaction (Van Willigen, 2000).

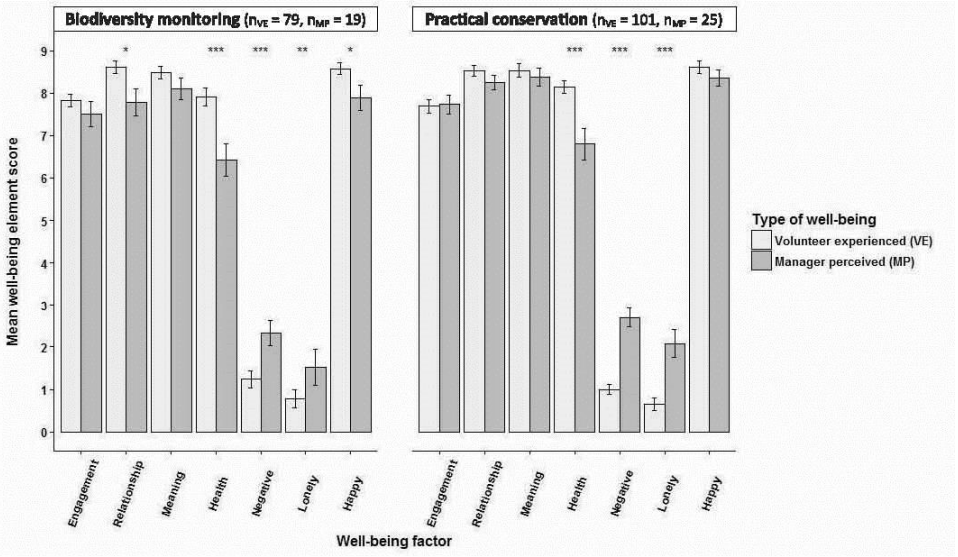

Figure 9. Volunteer experienced well-being compared to volunteer managers' perception of their volunteers' well-being. Volunteer experienced well-being just after volunteering ended compared to volunteer managers' perception of their volunteers' well-being (±SE bars). 'Engagement', 'relationship', 'meaning', 'negative emotion' and 'health' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures. Health was a mean of factor item aggregates for volunteers and a single item for managers (Wilcoxon rank sum tests, *p<0.05, **p<0.01, ***p<0.001).

The lowered levels of 'negative emotions' and 'loneliness' during all nature-based activities support previous research showing that volunteering and restorative experiences can decrease mental health issues such as depression (Korpela *et al.*, 2016; Musick & Wilson, 2008; Pillemer *et al.*, 2010; Townsend, 2006). It also supports the idea that volunteering reduces unhappiness (Binder & Freytag, 2013; Wilson, 2012), and has a positive effect on the positive elements of people's well-being.

Volunteering and physical health. Volunteers reported an increase in their health immediately after volunteering, reflecting previous research into practical conservation volunteering where volunteers, even though reporting they were in pain after volunteering, gained a sense of achievement from the pain, and perceived it as something positive (O'Brien *et al.*, 2010). However, this positive effect did not last as volunteers remembering their health during volunteering later on rated it similar to their general health, which was not different to the health of non-volunteers, suggesting there is no long-term positive effect of volunteering on perceived physical health. This finding supports previous research with similar findings (Borgonovi, 2008; Jenkinson *et al.*, 2013; Piliavin & Siegl, 2007), though some studies have found a positive relationship between volunteering and physical health (Pillemer *et al.*, 2010; Thoits & Hewitt, 2001; Van Willigen, 2000).

Biodiversity monitoring volunteers and students. The student group was the only participant group that did not consistently show improvements in all elements of well-being immediately after their activity. The unchanged sense of 'meaning' and lowered level of 'engagement' among students during their fieldwork could stem from them seeing the fieldwork as a mandatory activity that they did not freely choose, even if they did choose their university course. The feeling of personal control and choice of activity is important for an activity to be seen as a positive experience (Stukas *et al.*, 1999). As volunteers had freely chosen to participate in their activity, this may be one reason for the differences in activity-related well-being between students and biodiversity monitoring volunteers, even though they were performing the same type of tasks.

Practical conservation volunteers and walkers. Walking has previously been shown to decrease participants' mental illness and negative affect and increase their sense of well-being (e.g. Iwata *et al.*, 2016; Marselle *et al.*, 2014), which was also found in this study. However, the current research also showed that even bigger

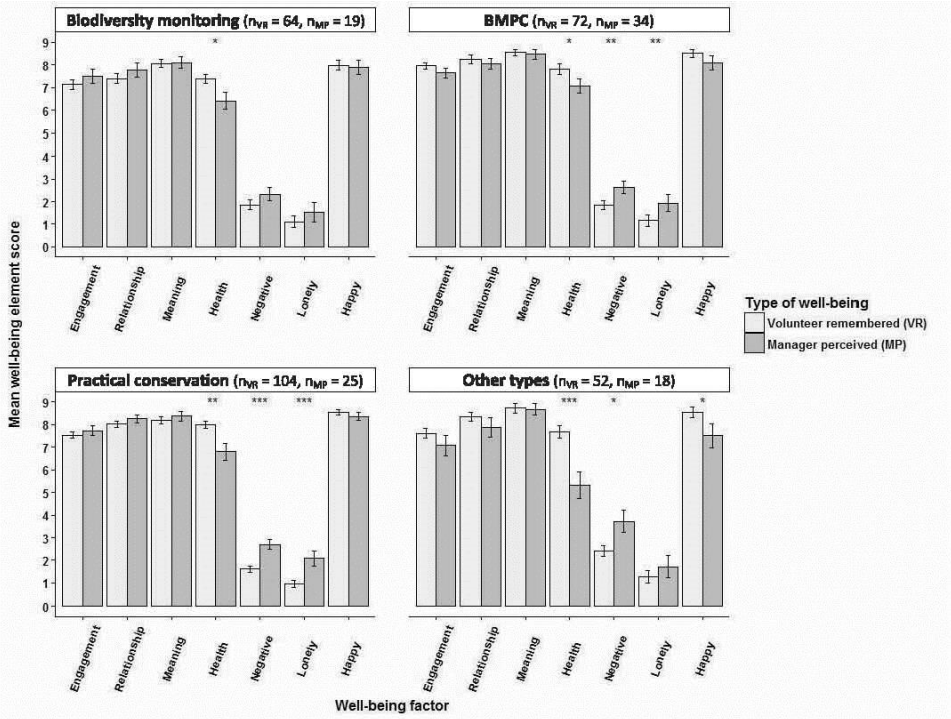

Figure 10. **Volunteer remembered well-being compared to volunteer managers' perception of their volunteers' well-being.** Volunteer remembered well-being compared to volunteer managers' perception of their volunteers' well-being (±SE bars). 'Engagement', 'relationship', 'meaning' and 'negative emotion' factor scores were means of factor item aggregates. 'Loneliness' and 'happiness' were single item measures. 'Health' was a mean of factor item aggregates for volunteers and a single item for managers (Wilcoxon rank sum tests; *p<0.05, **p<0.01, ***p<0.001). BMPC, biodiversity monitoring volunteers also doing practical conservation work.

decreases in negative affect can be achieved through practical conservation volunteering than through walking, and volunteering can have a positive effect on social relationships as well, an effect not consistently found for walking (Marselle *et al.*, 2014). The 'positive relationship' element included an item on support from others: "To what extent did you receive help and support from others when you needed it during your walk/volunteering today?" This item was particularly differently rated by volunteers and walkers, suggesting that volunteers felt much supported in their volunteering by volunteer managers and other volunteers, whereas walkers possibly either did not perceive a need to be supported or were not supported and therefore rated the item lower than volunteers. For practical conservation volunteers, the coffee and lunch breaks provided additional opportunities for social interactions, which were important to the volunteers, as highlighted by a comment from a practical conservation volunteer to the 'engagement' item 'To what extend did you lose track of time during volunteering today?'

> "I never lose track of time, I always know what time it is: It is either before coffee, after coffee, before lunch or after lunch!"
>
> (Male volunteer, Forestry Commission)

Volunteering has previously been found to benefit social well-being (Koss & Kingsley, 2010; O'Brien *et al.*, 2010; Onyx & Warburton, 2003; Son & Wilson, 2012), which was also the case in this study with practical conservation volunteers having significantly higher levels of 'positive relationships', not only during the volunteer activity but also generally in life, than walkers did. Volunteering provides a space where people are having fun with others, can engage in meaningful conversations and feel they are

understood, all of which can increase the quality of social relationships (Reis *et al.*, 2000).

How volunteers sustained the memory of the experienced sense of well-being

When volunteers recalled their experience of volunteering later on and up to six months after volunteering, their ratings of their well-being during volunteering were less positive than immediately after volunteering. This difference between experienced and remembered well-being during volunteering is likely partly due to recall bias (Baumeister *et al.*, 2001; Stone *et al.*, 1999), which is the imperfect recollection of past emotions or events by respondents. It has been shown that 'bad is stronger than good' (Baumeister *et al.*, 2001), which means that people remember and put more emphasis on negative events and emotions compared with positive events and emotions. Also volunteers in this research remembered the negative, as in the lowered 'negative emotions' and 'loneliness', better than the increased positive well-being indices. The 'meaning' element retained its high rating over time, supporting previous research that also showed retention of meaning (Wyles *et al.*, 2016), and suggesting it may be a more robust construct than the 'engagement' or 'relationship' factors that did not retain their high ratings over time. 'Meaning' is part of eudaimonia and as such has been suggested to be longer-lasting than hedonic emotions, or moods, such as 'positive emotions' and partly the 'engagement' element (Piliavin, 2009).

Volunteer managers' perception of volunteer well-being and how it compares to actual volunteer well-being

Managers in environmental volunteering rated the 'health' element of their volunteers' well-being higher than non-environmental volunteer managers did. This difference between environmental and non-environmental managers' perception of their volunteers' health is possibly a reflection of the physical stamina and strength needed to perform environmental volunteering (O'Brien *et al.*, 2010), whether the tasks are clearing invasive species or walking across uneven ground to record the species composition of an area. Volunteer managers spending more time with their volunteers seemed to better understand the well-being of their volunteers, as they rated their volunteers' well-being more similar to volunteers' ratings than managers who spent less time with their volunteers. However, managers still perceived volunteers as having more 'negative emotions', being 'lonelier' and being in worse 'health' than volunteers themselves reported. These worse ratings of negative indices are in line with previous research. A meta-analysis of self-reported and other-reported agreement in well-being ratings found an average correlation of 0.42 between average self-ratings and other-reported ratings for a combined score of life satisfaction, happiness, positive affect and negative affect (Schneider & Schimmack, 2009). Positive and negative affect measures had relatively low agreement, and negative affect (r=0.18) had less agreement than positive affect (r=0.24) (Schneider & Schimmack, 2009). Again, this finding could reflect that managers also put more emphasis on and remember negative emotions and events better than positive emotions and events (Baumeister *et al.*, 2001).

Using a multidimensional approach to well-being in a volunteering context

It has been suggested that volunteering brings both hedonic and eudaimonic well-being benefits to volunteers (Piliavin, 2009), and such a multidimensional approach to well-being was supported by this research. It recovered five of the seven proposed factors from the PERMA-P (Butler & Kern, 2016), including the 'engagement', 'relationship', 'meaning', 'health' and 'negative emotion' factors, but excluding the 'positive emotion' and 'achievement' factors. 'Achievement' items instead related to both the 'engagement' and 'meaning' factors, suggesting volunteers may not have set goals for themselves within their volunteering role and therefore not been focused on the achievement of any specific goals. This scenario was also supported by comments from volunteers stating that they did not have specific goals for their volunteering. 'Positive emotion' items instead related to the 'engagement' and 'relationship' factors, suggesting that volunteers did not pursue the positive emotions themselves, but rather that positive emotions arose due to positive relationships and task engagement during volunteering. Future research is needed to further tease apart these relationships in a volunteering context. The value of a multidimensional approach to well-being in the volunteering context is the information gained about how volunteering affects the various elements of well-being differently. In this sample of volunteers, the effects of volunteering were all positive; however, for the students, their engagement decreased during their fieldwork, highlighting an area that should be investigated further to find ways to turn this negative effect around.

Implications

Walking has been advocated as a public health intervention (Iwata *et al.*, 2016; Marselle *et al.*, 2014), which the present findings support. However, they also suggest that environmental volunteering may provide increased benefits over and above the benefits of walking. For public health providers, this highlights environmental volunteering as a potential health intervention and a way to reintegrate people into society (O'Brien *et al.*, 2011) by providing opportunities for positive relationships to develop. However, care must be taken to ensure that people actively choose the activity and do not feel forced to volunteer, as personal control and choice is important for a positive outcome (Stukas *et al.*, 1999). For volunteer organisations, these positive results highlight that environmental volunteer projects provide benefits to the volunteers themselves and could be useful in motivating people to begin volunteering. In addition, it provides an opportunity to showcase to funding bodies that environmental volunteer projects provide positive outcomes also for the people involved in the projects.

The use of multidimensional well-being measures can provide the information that volunteer organisations and managers need to support and enhance the well-being of their volunteers. By assessing the individual elements, areas for improvement can be specifically targeted. For example, if the 'meaning' element is rated low by volunteers, improved feedback could be provided to volunteers to enhance their understanding of their role and thereby the meaning they derive from their volunteering. If 'relationships' are rated low, focus should be put on providing adequate support to volunteers during volunteering, as well as ensuring volunteers feel appreciated. Even if volunteers find their roles meaningful and relationships good, their 'engagement' may be lacking if they are not given interesting tasks and opportunities to fully immerse themselves in their volunteer tasks.

Conclusion

This study has shown the benefits of regarding volunteer well-being as a multidimensional construct to better understand how volunteering affects the various elements of well-being. It has highlighted how environmental volunteering immediately improved the well-being of participants, even more than other nature-based activities did. Volunteering improved participants' well-being especially by lowering negative emotions and loneliness, and this was remembered long after volunteering ended. Most volunteer managers, however, did not perceive this significant decrease in negative emotions and loneliness in their volunteers during volunteering, although they did perceive an increase in positive well-being elements. This focus on negative emotions and events is possibly due to the well-established theory that 'bad is stronger than good'. Volunteer organisations can use multidimensional assessment of volunteers' well-being and managers' perception of their volunteers' well-being to identify and gain a deeper understanding of actual well-being, gaps in volunteer managers' perceptions and potential areas for improvement.

Data availability

Dataset 1. Raw data from study 1, the onsite nature-based activity survey.
The raw data from onsite questionnaires of environmental volunteers and their control groups (walkers and students) supporting the findings described in the paper are provided. (DOI: 10.5256/f1000research.10016.d142072; Kragh *et al.*, 2016a).

Dataset 2. Raw data from study 2, the online volunteer survey.
The raw data from online questionnaires of current, former and potential volunteers supporting the findings described in the paper are provided. (DOI: 10.5256/f1000research.10016.d142073; Kragh *et al.*, 2016b).

Dataset 3. Raw data from study 3, the online volunteer manager survey.
The raw data from online questionnaires of current and former volunteer managers supporting the findings described in the paper are provided. (DOI: 10.5256/f1000research.10016.d142074; Kragh *et al.*, 2016c).

Author contributions

All authors participated in study development and design. GK carried out the research, performed data analysis and prepared the first draft of the manuscript. All authors were involved in the revision of the draft manuscript and have agreed to the final content.

Competing interests

No competing interests were disclosed.

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Supplementary material

Supplementary Table 1. Acknowledgements go to all the volunteers, volunteer managers, students and walkers from the organisations detailed in the table.

Click here to access the data.

Supplementary File 1. The volunteer questionnaires used in Study 1.

Provided here are the before-volunteering and after-volunteering questionnaires used for environmental volunteers. Similar surveys, but with appropriately adapted wording, were used for walkers and students.

Click here to access the data.

Supplementary File 2. The volunteer questionnaire used in Study 2.

Provided here are the survey items in the online survey pertaining to the volunteer-related well-being of current environmental volunteers. Similar surveys, but with appropriately adapted wording, were used for non-environmental volunteers, as well as former and potential volunteers.

Click here to access the data.

Supplementary File 3. The volunteer manager questionnaire used in Study 3.

Provided here are the survey items in the online survey pertaining to current environmental volunteer managers' perception of the well-being of their volunteers. Similar surveys, but with appropriately adapted wording, were used for non-environmental volunteer managers, as well as former volunteer managers.

Click here to access the data.

References

Ahern NR: **Using the internet to conduct research.** *Nurse Res.* 2005; **13**(2): 55–70.
PubMed Abstract | Publisher Full Text

Aristotle: **The Nicomachean Ethics.** Oxford University Press, Translated by David Ross, revised with an introduction and notes by Lesley Brown, New York, 2009.
Reference Source

Baumeister R, Bratslavsky E, Finkenauer C: **Bad is stronger than good.** *Rev Gen Psychol.* 2001; **5**(4): 323–370.
Publisher Full Text

Baumeister RF, Leary MR: **The need to belong: Desire for interpersonal attachments as a fundamental human motivation.** *Psychol Bull.* 1995; **117**(3): 497–529.
PubMed Abstract | Publisher Full Text

Bell S, Marzano M, Reinert H, *et al.*: **What counts? Volunteers and their organisations in the recording and monitoring of biodiversity.** *Biodivers Res Conserv.* 2008; **17**(14): 3443–3454.
Publisher Full Text

Bernaards CA, Jennrich RI: **Gradient Projection Algorithms and Software for Arbitrary Rotation Criteria in Factor Analysis.** *Educ Psychol Meas.* 2005; **65**(5): 676–696.
Publisher Full Text

Binder M, Freytag A: **Volunteering, subjective well-being and public policy.** *J Neurosci Psychol Econ.* 2013; **34**: 97–119.
Publisher Full Text

Borgonovi F: **Doing well by doing good. The relationship between formal volunteering and self-reported health and happiness.** *Soc Sci Med.* 2008; **66**(11): 2321–2334.
PubMed Abstract | Publisher Full Text

Bowler DE, Buyung-Ali LM, Knight TM, *et al.*: **A systematic review of evidence for the added benefits to health of exposure to natural environments.** *BMC Public Health.* 2010; **10**(1): 456.
PubMed Abstract | Publisher Full Text | Free Full Text

Bradburn NM: **The structure of psychological well-being.** BOOK, Aldine, Oxford, England. 1969.
Reference Source

Brooks A: **Does giving make us prosperous?** *J Econ Finance.* 2007; **31**(3): 403–411.
Publisher Full Text

Butler J, Kern ML: **The PERMA-Profiler: A brief multidimentional measure of flourishing.** *International Journal of Wellbeing.* 2016; **6**(3): 1–48.
Reference Source

Cattell R: **The scree test for the number of factors.** *Multivariate Behav Res.* 1966; **1**(2): 245–276.
PubMed Abstract | Publisher Full Text

Cortina JM: **What is coefficient alpha? An examination of theory and applications.** *J Appl Psychol.* 1993; **78**(1): 98–104.
Publisher Full Text

Cronbach L: **Coefficient alpha and the internal structure of tests.** *Psychometrika.* 1951; **16**(3): 297–334.
Publisher Full Text

Csikszentmihalyi M: **Beyond boredom and anxiety.** Book, Jossey-Bass Publishers, San Francisco; 1975.
Reference Source

Csikszentmihalyi M: **Flow: the psychology of optimal experience.** Book, HarperPerennial, New York; 1991.
Reference Source

Diener E: **Subjective well-being.** *Psychol Bull.* 1984; **95**(3): 542–575.
PubMed Abstract | Publisher Full Text

Diener Ed: **Assessing subjective well-being: Progress and opportunities.** *Soc Indic Res.* 1994; **31**(2): 103–157.
Publisher Full Text

Diener E: **Subjective well-being. The science of happiness and a proposal for a national index.** *Am Psychol.* 2000; **55**(1): 34–43.
PubMed Abstract | Publisher Full Text

Diener Ed, Suh EM, Lucas RE, *et al.*: **Subjective well-being: Three decades of progress.** *Psychol Bull.* 1999; **125**(2): 276–302.
Publisher Full Text

Dziuban CD, Shirkey EC: **When is a correlation matrix appropriate for factor analysis? Some decision rules.** *Psychol Bull.* 1974; **81**(6): 358–361.
Publisher Full Text

Evans C, Abrams E, Reitsma R, *et al.*: **The Neighborhood Nestwatch Program: participant outcomes of a citizen-science ecological research project.** *Conserv Biol.* 2005; **19**(3): 589–594.
Publisher Full Text

Forgeard MJC, Jayawickreme E, Kern ML, *et al.*: **Doing the Right Thing: Measuring Well-Being for Public Policy.** *International Journal of Wellbeing.* 2011; **1**(1): 79–106.
Publisher Full Text

Frumkin H: **Beyond toxicity: human health and the natural environment.** *Am J Prev Med.* 2001; **20**(3): 234–240.
PubMed Abstract | Publisher Full Text

Gimenez-Nadal JI, Molina JA: **Voluntary Activities and Daily Happiness in the US.** Discussion Paper No. 8764. Bonn: IZA, 2015; **53**(4): 1735–1750.
Publisher Full Text

Gooch M: **Voices of the Volunteers: an Exploration of the Experiences of Catchment Volunteers in Coastal Queensland, Australia.** *Local Environ.* 2005; **10**(1): 5–19.
Publisher Full Text

Greenfield EA, Marks NF: **Formal volunteering as a protective factor for older adults' psychological well-being.** *J Gerontol B Psychol Sci Soc Sci.* 2004; **59**(5): S258–264.
PubMed Abstract | Publisher Full Text

Guiney MS, Oberhauser KS: **Conservation volunteers' connection to nature.** *Ecopsychology.* 2009; **1**(4): 187–197.
Publisher Full Text

Harlow RE, Cantor N: **Still participating after all these years: a study of life task participation in later life.** *J Pers Soc Psychol.* 1996; **71**(6): 1235–1249.
PubMed Abstract | Publisher Full Text

Ho HC: **Elderly volunteering and psychological well-being.** *Int Soc Work.* In Press, 2015.
Publisher Full Text

Horn JI: **A rationale and test for the number of factors in factor analysis.** *Psychometrika.* 1965; **30**(2): 179–185.
PubMed Abstract | Publisher Full Text

Hu L, Bentler PM: **Cutoff criteria for fit indexes in covariance structure analysis:**

Conventional criteria versus new alternatives. *Struct Equ Modeling.* 1999; **6**(1): 1–55.
Publisher Full Text

Iwata Y, Dhubháin ÁN, Brophy J, *et al.*: **Benefits of Group Walking in Forests for People with Significant Mental Ill-Health.** *Ecopsychology.* 2016; **8**(1): 16–26.
Publisher Full Text

Jenkinson CE, Dickens AP, Jones K, *et al.*: **Is volunteering a public health intervention? A systematic review and meta-analysis of the health and survival of volunteers.** *BMC Public Health.* 2013; **13**(1): 773.
PubMed Abstract | Publisher Full Text | Free Full Text

Kaiser HF: **The Application of electronic computers to factor analysis.** *Educ Psychol Meas.* 1960; **20**(1): 141–151.
Publisher Full Text

Kaplan R: **The role of nature in the urban context.** In: I Altman and JF Wohlwill, editors. *Behavior and the Natural Environment.* Journal Article, Plenum Press, New York. 1983; **6**: 127–161.
Publisher Full Text

Kellert SR, Wilson EO: **The Biophilia hypothesis.** Book, Island Press, Washington, D.C. 1993.
Reference Source

Keyes CL: **The Mental Health Continuum: From Languishing to Flourishing in Life.** *J Health Soc Behav.* 2002; **43**(2): 207–222.
PubMed Abstract

Konrath S, Fuhrel-Forbis A, Lou A, *et al.*: **Motives for volunteering are associated with mortality risk in older adults.** *Health Psych.* 2012; **31**(1): 87–96.
PubMed Abstract | Publisher Full Text

Korpela KM, Stengård E, Jussila P: **Nature Walks as a Part of Therapeutic Intervention for Depression.** *Ecopsychology.* 2016; **8**(1): 8–15.
Publisher Full Text

Koss RS, "Yotti" Kingsley J: **Volunteer health and emotional wellbeing in marine protected areas.** *Ocean Coast Manag.* 2010; **53**(8): 447–453.
Publisher Full Text

Kragh G, Stafford R, Curtin S, *et al.*: **Dataset 1 in: Environmental volunteer well-being: Managers' perception and actual well-being of volunteers.** *F1000Research.* 2016a.
Data Source

Kragh G, Stafford R, Curtin S, *et al.*: **Dataset 2 in: Environmental volunteer well-being: Managers' perception and actual well-being of volunteers.** *F1000Research.* 2016b.
Data Source

Kragh G, Stafford R, Curtin S, *et al.*: **Dataset 3 in: Environmental volunteer well-being: Managers' perception and actual well-being of volunteers.** *F1000Research.* 2016c.
Data Source

Likert R: **A technique for the measurement of attitudes.** *Arch Psychol.* 1932; **22**(140): 5–55.
Reference Source

MacCallum RC, Browne MW, Sugawara HM: **Power analysis and determination of sample size for covariance structure modeling.** *Psychol Methods.* 1996; **1**(2): 130–149.
Publisher Full Text

Marselle MR, Irvine KN, Warber SL: **Examining Group Walks in Nature and Multiple Aspects of Well-Being: A Large-Scale Study.** *Ecopsychology.* 2014; **6**(3): 134–147.
Reference Source

Matsunaga M: **How to Factor-Analyze Your Data Right: Do's, Don'ts, and How-To's.** *Int J Psychol Res.* 2010; **3**(1): 98–111.
Reference Source

Morrow-Howell N, Hinterlong J, Rozario PA, *et al.*: **Effects of volunteering on the well-being of older adults.** *J Gerontol B Psychol Sci Soc Sci.* 2003; **58**(3): S137–145.
PubMed Abstract | Publisher Full Text

Muirhead S: **Nature and well-being: building social and emotional capital through environmental volunteering.** Thesis (PhD): University of Dundee, 2011.
Reference Source

Musick MA, Wilson J: **Volunteers: a social profile.** Book, Bloomington: Indiana University Press, 2008.
Reference Source

Natural England: **Monitor of Engagement with the Natural Environment: Annual Report from the 2013–14 survey.** Natural England, Peterborough, 2015.
Reference Source

Nunnally JC: **Psychometric theory.** 2nd edition. Book, McGraw-Hill, New York; London: 1978.
Reference Source

O'Brien L, Burls A, Townsend M, *et al.*: **Volunteering in nature as a way of enabling people to reintegrate into society.** *Perspect Public Health.* 2011; **131**(2): 71–81.
PubMed Abstract | Publisher Full Text

O'Brien L, Townsend M, Ebden M: **"Doing Something Positive": Volunteers' Experiences of the Well-Being Benefits Derived from Practical Conservation Activities in Nature.** *Voluntas: International Journal of Voluntary and Nonprofit Organizations.* 2010; **21**(4): 525–545.
Publisher Full Text

Onyx J, Warburton J: **Volunteering and health among older people: A review.** *Australas J Ageing.* 2003; **22**(2): 65–69.
Publisher Full Text

Piliavin J: **Volunteering across the life span: Doing well by doing good.** In S Stürmer and M Snyder, editors. *The psychology of prosocial behavior: Group processes, intergroup relations, and helping.* Wiley-Blackwell, Chichester, 2009; 157–172.
Publisher Full Text

Piliavin JA, Siegl E: **Health Benefits of Volunteering in the Wisconsin Longitudinal Study.** *J Health Soc Behav.* 2007; **48**(4): 450–464.
PubMed Abstract | Publisher Full Text

Pillemer K, Fuller-Rowell TE, Reid MC, *et al.*: **Environmental volunteering and health outcomes over a 20-year period.** *Gerontologist.* 2010; **50**(5): 594–602.
PubMed Abstract | Publisher Full Text | Free Full Text

Pretty J, Peacock J, Sellens M, *et al.*: **The mental and physical health outcomes of green exercise.** *Int J Environ Health Res.* 2005; **15**(5): 319–337.
PubMed Abstract | Publisher Full Text

Raiche G: **nFactors: an R package for parallel analysis and non graphical solutions to the Cattell scree test.** 2010.
Reference Source

Reis HT, Sheldon KM, Gable SL, *et al.*: **Daily well-being: The role of autonomy, competence, and relatedness.** *Pers Soc Psychol B.* 2000; **26**(4): 419–435.
Publisher Full Text

Revelle W: **psych: Procedures for Personality and Psychological Research.** Northwestern University, Evanston, Illinois, USA; 2016.
Reference Source

Rosseel Y: **lavaan: An R package for structural equation modeling.** *J Stat Softw.* 2012; **48**(2): 1–36.
Publisher Full Text

RStudio Team: **RStudio: Integrated Development for R.** RStudio, Inc., Boston, MA. 2015.

Ryan RM, Deci EL: **On happiness and human potentials: a review of research on hedonic and eudaimonic well-being.** *Annu Rev Psychol.* 2001; **52**: 141–166.
PubMed Abstract | Publisher Full Text

Ryff CD: **Happiness Is Everything, or Is It? Explorations on the Meaning of Psychological Well-Being.** *J Pers Soc Psychol.* 1989; **57**(6): 1069–1081.
Publisher Full Text

Ryff CD: **Psychological Well-Being in Adult Life.** *Curr Dir Psychol Sci.* 1995; **4**(4): 99–104.
Publisher Full Text

Ryff CD: **Psychological well-being revisited: advances in the science and practice of eudaimonia.** *Psychother Psychosom.* 2014; **83**(1): 10–28.
PubMed Abstract | Publisher Full Text

Schneider L, Schimmack U: **Self-Informant Agreement in Well-Being Ratings: A Meta-Analysis.** *Soc Indic Res.* 2009; **94**(3): 363–376.
Publisher Full Text

Seligman ME: **Flourish: A New Understanding of Happiness and Well-Being - and How To Achieve Them.** Nicholas Brealey Publishing, London. 2011.
Reference Source

Smith DH: **Altruism, Volunteers, and Volunteerism.** *Nonprofit Volunt Sect Q.* 1981; **10**(1): 21–36.
Publisher Full Text

Son J, Wilson J: **Volunteer Work and Hedonic, Eudemonic, and Social Well-Being.** *Sociol Forum.* 2012; **27**(3): 658–681.
Publisher Full Text

Stone A, Shiffman S, DeVries M: **Ecological momentary assessment.** In D Kahneman, E Diener, and N Schwarz, editors. *Well-being: The foundations of hedonic psychology.* Russell Sage Foundation, New York, 1999; 26–39.
Reference Source

Stukas AA, Hoye R, Nicholson M, *et al.*: **Motivations to Volunteer and Their Associations With Volunteers' Well-Being.** *Nonprofit Volunt Sect Q.* 2016; **45**(1): 112–132.
Publisher Full Text

Stukas AA, Snyder M, Clary EG: **The Effects of "Mandatory Volunteerism" on Intentions to Volunteer.** *Psychol Sci.* 1999; **10**(1): 59–64.
Publisher Full Text

Thoits PA, Hewitt LN: **Volunteer work and well-being.** *J Health Soc Behav.* 2001, **42**(2): 115–131.
PubMed Abstract | Publisher Full Text

Townsend M: **Feel blue? Touch green! Participation in forest/woodland management as a treatment for depression.** *Urban For Urban Gree.* 2006; **5**(3): 111–120.
Publisher Full Text

Unger LS: **Altruism as a motivation to volunteer.** *J Econ Psychol.* 1991; **12**(1): 71–100.
Publisher Full Text

Van Willigen M: **Differential benefits of volunteering across the life course.** *J Gerontol B Psychol Sci Soc Sci.* 2000; **55**(5): S308–S318.
PubMed Abstract | Publisher Full Text

Velicer WF: **Determining the number of components from the matrix of partial correlations.** *Psychometrika.* 1976; **41**(3): 321–327.
Publisher Full Text

Wheeler JA, Gorey KM, Greenblatt B: **The beneficial effects of volunteering for older volunteers and the people they serve: a meta-analysis.** *Int J Aging Hum Dev.* 1998; **47**(1): 69–79.
PubMed Abstract | Publisher Full Text

Wickham H: **ggplot2: Elegant Graphics for Data Analysis.** Springer-Verlag, New York, USA. 2009.
Publisher Full Text

Wilson J: **Volunteering.** *Annu Rev Sociol.* 2000; **26**: 215–240.
Publisher Full Text

Wilson J: **Volunteerism Research: A Review Essay.** *Nonprofit Volunt Sect Q.* 2012; **41**(2): 176–212.
Publisher Full Text

Windsor TD, Anstey KJ, Rodgers B: **Volunteering and psychological well-being among young-old adults: how much is too much?** *Gerontologist.* 2008; **48**(1): 59–70.
PubMed Abstract | Publisher Full Text

Wyles KJ, Pahl S, Holland M, *et al.*: **Can Beach Cleans Do More Than Clean-Up Litter? Comparing Beach Cleans to Other Coastal Activities.** *Environ Behav.* 2016; 1–27.
Publisher Full Text