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"Hitting the Ground Running": Preparing Groups for Outdoor Learning using a Theoretically-Based Video

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Abstract

Our thoughts and feelings towards groupwork and outdoor learning impact our subsequent engagement and learning. This study explores the impact of a pre-course video when used to prepare attendees' for an outdoor learning experience. The video was designed according to the theory of planned behaviour (TPB) and was shown to university students at the beginning of a 3-day outdoor residential course to develop their groupwork skills (N = 173). At course induction, participants were assigned to either video-only, video with a goal setting worksheet, or control conditions. Their thoughts and feelings towards the course were measured pre- and post-induction and their groupwork skills were measured pre- and post-course. In line with the TPB, participants' attitudes and self-efficacy towards the course were significant and meaningful predictors of their learning intention and subsequent behaviour change. These pre-course beliefs towards groupwork and outdoor learning were significantly improved by the video, despite learners already holding favourable beliefs at baseline. However, these high baseline scores meant that the improvements in attitudes resulting from the video were small, and not enough to enhance the subsequent learning outcomes. The potential mechanisms of the pre-course video are discussed along with practical implications.

"Hitting the Ground Running": Preparing Groups for Outdoor Learning using a Theoretically-Based Video

The mindset an individual brings to an educational experience can have a profound impact on their engagement and subsequent learning (Dewey, 1897; Dweck, 2006). If an individual does not feel adequately prepared, a learning experience could fail before it has even begun (Baldwin & Ford, 1988; Fredricks, Blumenfeld, & Paris, 2004). This preparation is particularly important in outdoor learning, where learners are sometimes reluctant to partake due to fears and discomforts concerning the outdoor environment (Bixler, Carlisle, Hammltt, & Floyd, 1994) or negative perceptions of working in groups (Pauli, Mohiyeddini, Bray, Michie, & Street, 2008). Appropriate preparation is therefore recommended for outdoor learners to be in the right frame of mind for learning to take place (Cooley, Cumming, Holland, & Burns, 2015).

The theory of planned behaviour (TPB) is a model of behaviour change that acknowledges the importance of our thoughts and feelings when planning to change or develop a behaviour (Ajzen, 1991). The TPB was originally designed in the context of smoking cessation but is now used more widely in the design of behaviour change interventions in educational, business, and health settings. The theory proposes that a person approaching an experience, such as outdoor learning, has a dynamic set of beliefs that influence their intention to engage. According to the TPB, our intentions are influenced by three sets of beliefs: our *attitudes* (e.g., what we view as the potential consequences of our engagement), *subjective norms* (e.g., our expectations of others), and *perceived behavioural control* (e.g., beliefs about the control we have over the experience). Further to this, our attitudes can be broken down into *affective* (e.g., "this experience will be enjoyable") or *instrumental* (e.g., "this experience will be beneficial"). Subject norms comprise both *injunctive norms* (e.g., "people who matter to me expect me to engage in this experience")

and *descriptive norms* (e.g., "my peers will engage in this experience"). And finally, perceived behavioural control comprises both self-efficacy (e.g., "I am confident that I can succeed in this experience") and controllability (e.g., "success during this experience is within my control"). In general, more favourable attitudes, subjective norms, and perceived behavioural control will lead to stronger intentions to engage in an experience and a greater likelihood of behaviour change (Ajzen, 1991).

Although the TPB is more typically used to understand and influence health behaviours such as smoking, physical activity, and diet (Darker, French, Eves, & Sniehotta, 2010; Eves, Hoppéa, & McLaren, 2003; McEachan, Conner, Taylor, & Lawton, 2011), it has also been previously applied to educational experiences. That is, in higher education, attitudes, subjective norms, and perceived behavioural control have been found to positively predict both the intention to attend classes and actual attendance (Ajzen & Madden, 1986; White, O'Connor, & Hamilton, 2011; White, Thomas, Johnston, & Hyde, 2008). The TPB variables also positively predict study behaviour leading up to final year examinations (Sideridis, Kaissidis, & Padeliadu, 1998).

Although the TPB has yet to be investigated in the context of outdoor learning, these previous findings, and the broader TPB literature, suggest that attitudes, subjective norms, and perceived behavioural control towards groupwork and the outdoors are likely to impact the outdoor learning experience. Fortunately, these preconceptions in learners are found to be "malleable, responsive to contextual features, and amendable to environmental change" (Fredricks et al., 2004, p.59). Following their review of the literature, Fredricks and colleagues (2004) identified a need for more empirically supported interventions to better prepare learners' mindsets and optimise their subsequent engagement.

Outside of outdoor learning, videos have been shown to be an effective medium for changing perceptions and behaviour, including improving self-efficacy towards teamwork

(Dilworth, Mokrue, & Elias, 2002), self-care (Clark & Lester, 2000), and sexual health behaviour (Downs et al., 2004). Other studies have explicitly used the TPB in the design and evaluation of videos. For example, videos aimed at promoting road safety (Parker, Stradling, & Manstead, 1996; Poulter & McKenna, 2010), weight management (Rodgers & Brawley, 1993), and HIV prevention (Sanderson & Jemmott, 1996) have led to improvements across the range of variables within the TPB (i.e., attitudes, subjective norms, perceived behavioural control, intentions, and behaviour). These previous studies clearly demonstrate the positive impact a video can have on health and risk-related behaviour. However, to the authors' knowledge, there is little empirical evidence of the effect a video has when used in preparation for an outdoor learning experience.

Using videos to foster more positive attitudes and behaviour is also supported by behaviour change theories (for reviews see Hinyard & Kreuter, 2007; Slater, 1999). For example, Bandura's (1982) social cognitive theory would suggest that observing others who are successfully taking part in outdoor learning may improve self-efficacy beliefs, outcome expectations, and result in behavioural modelling. Similarly, a video shown before an outdoor learning experience is also likely to prompt us to 'contemplate' and 'prepare' for the experience, which are the precursory steps to 'taking action', according to the transtheoretical model of behaviour change (Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997; Slater, 1999). Incorporating these additional theories when developing a video is important as the TPB variables alone cannot account for all variation in behaviour change, particularly when considering that behaviour change to some degree occurs at a subconscious level (Sniehotta, Presseau, & Araujo-Soares, 2014).

The present study was conducted during an outdoor residential course for university students. Our previous research found this course to be effective in developing key groupwork skills that benefitted students' future experiences at university and beyond

(Cooley, Holland, Cumming, Novakovic, & Burns, 2014; Cooley, 2015; Cooley, Cumming et al., 2015; Cooley, Burns, & Cumming, 2016). However, even though courses were often provided on an 'opt-in' basis, attendees were found to differ in their awareness of the course objectives and their attitudes towards groupwork and the outdoor environment (Cooley et al., 2014; Cooley, Cumming et al., 2015). These individual differences were found to influence engagement and subsequent learning, and this relationship was exacerbated by the relatively short duration of the learning experience (Cooley, Cumming et al., 2015). That is, when the opportunity for learning was brief (e.g., a 3-day residential), there was less time during the course for mindsets to change and individuals were required to "hit the ground running" from the outset (Cooley, Cumming et al., 2015, p.115).

In the present study, groups of students attending the residential were assigned to one of three conditions: video, video+worksheet, and control (NB: the video is available within the online supplementary material). In the video condition, participants were shown the video during the standard course induction meeting. In the video+worksheet condition, participants completed an additional worksheet alongside the video that encouraged them to consider the messages in the video and set personal goals, which are proven techniques for enhancing the likelihood of behaviour change (Petty & Cacioppo, 1986; Gollwitzer, 1999). In the control condition, participants received only the standard course induction.

The primary aim of the present study was to investigate the effect of the video intervention on the TPB variables and subsequent learning. In doing so, three hypotheses were tested:

> H_1: The TPB model is supported within the context of outdoor learning (i.e., attitudes, subjective norms, and perceived behavioural control are positively related to learning intentions, and learning intentions are positively related to behaviour change).

H_2: The pre-course video has a positive effect on the TPB variables (i.e., those who watch the video report more positive attitudes, subjective norms, perceived behavioural control, and learning intentions), which is further enhanced by the inclusion of the video worksheet.

H_3: Improving the TPB variables during the course induction will have a positive influence on the course outcomes (i.e., changes in groupwork behaviour).

In testing these hypotheses, the present study demonstrates a real world, pragmatic example of theory led video development and evaluation, as well as contributing to our theoretical understanding of the TPB and the factors that influence learner preparation and engagement in outdoor learning.

Method

Participants

Students at a British university attended one of seven iterations of the same outdoor residential course, each within their respective degree cohorts: MSc International Accounting and Finance (n = 82; 3 iterations), MSc International Business (n = 52; 2 iterations), and Foundation degree students (n = 39; 2 iterations). Of these 189 attendees, 173 (92%) agreed to participate in the study (Mage = 22.87, SD = 2.45; Females = 63%, Males 37%). Reflective of the degree courses taking part, the majority were international students (96.5%), mainly from China (64% of the sample), followed by Indonesia (7.4%), with 19 other countries represented. There were 17 different first languages spoken and all students had reached the appropriate level in English language entrance tests. Permission to conduct the study was granted by the university ethics committee and informed consent was obtained.

Outdoor Residential

Students in the present study were encouraged by their academic course staff to attend the outdoor residential as an extracurricular aspect of their degree program, for the purposes

of integration and developing transferable groupwork skills. Whilst some students were attracted by the personal development prospects, others signed up for the social experience and to enjoy the location and outdoor activities (e.g., high ropes, mountaineering, raft building, canoeing, gorge walking, etc.), which were all offered free of charge. Those who chose to attend travelled to a university-owned outdoor pursuit centre in a rural location approximately 4 hours' drive from their university campus. The residential, which lasted between 3 and 5 days, began with an induction meeting on arrival followed by short outdoor icebreaker activities (e.g., blindfolded navigation tasks, building bridges, and passing through 'spiders webs'). Activities progressed to longer and more challenging tasks such as obstacle courses and canoeing activities, which were specifically designed to encourage groupwork. Qualified instructors followed the experiential learning cycle (Kolb, 1984) by incorporating frequent periods of reflective learning before commencing the next task (see Cooley, 2015 for a more detailed description of the course).

Video Development

The steps taken to develop the video were informed by previous recommendations (i.e., Slater, 1999; Hinyard & Kreuter, 2007) and development protocols for TPB interventions (Parker, Stradling, & Manstead, 1996; Poulter & McKenna, 2010; Rodgers & Brawley, 1993; Sanderson & Jemmott, 1996), as discussed below.

Step 1: Establishing common beliefs. Qualitative data from previous studies of the same outdoor residential course (Cooley et al., 2014; 2015) were recoded deductively to identify examples of common beliefs relating to each TPB variable. For example, these beliefs included students' expectations, likes and dislikes towards groupwork and the residential, common concerns, and perceived benefits. This data included the perspectives of academic staff, students, alumni, and outdoor instructors.

Step 2: Creating a storyboard. The video storyboard involved three main phases: students working together at university before the residential, the residential itself, and students' return to university. At each stage, the common beliefs identified in Step 1 were listed to ensure that they could be incorporated into the narrative. The storyboard also included a few statistics, as previous studies support the use of both statistics and narrative within persuasive messages (Allen & Preiss, 1997; Slater & Rouner, 1996).

Step 3: Developing interview questions. Interview questions for volunteers featuring in the video were designed to address common negative beliefs and reinforce common favourable beliefs related to the TPB variables. This approach ensured that the volunteers gave reassuring and constructive messages that would resonate and build confidence in those about to embark on the course. Previous research shows that optimistic messages have a more positive impact on attitudes, intentions, and learning, compared to messages containing more realist views that are less positive (Karl & Ungsrithong, 1992).

Step 4: Filming. A professional cameraman filmed the interviews at each stage of the storyboard. Students were also filmed working together effectively in different activities both in an academic setting and on the outdoor residential. Students reflecting a range of nationalities and genders were deliberately included in the video to reflect the diverse student groups that attend the residential course.

Step 5: Review and edit. The research team reviewed over 4 hours of footage. Key segments of recording were mapped onto the storyboard, ensuring all TPB variables were addressed at each stage (see Table 1). As higher quality videos are likely to result in a more vivid and transformative viewing experience (Hinyard & Kreuter, 2007), a professional editor produced the video.

Step 6: Pilot testing. To assess whether or not the intended TPB constructs were sufficiently targeted, the completed video was shown to 16 postgraduate students who were

attending an information meeting about an upcoming course. After watching the video, participants completed a questionnaire measuring the extent to which the video had influenced different TPB related constructs on a scale of 1 (*Not at all*) to 7 (*A great deal*). For example, *"To what extent did the video make you feel that attending the course to develop your groupwork skills would be fun?"* (affective attitude). The pilot testing resulted in positive feedback, with mean scores between 5.6 and 6.6 across all TPB variables. Constructive feedback was also gained through open-ended questions.

Step 7: Final edits. The video was improved based on the comments received in Step 6. The main improvements were less repetition of certain key messages and more variety of activity footage from the outdoor residential. The final version was 11 min 45 sec in length and can be viewed in the online supplementary material (See Table 1 for a video outline).

Step 8: Developing a worksheet to enhance engagement. The elaboration likelihood model was first introduced as a marketing technique for achieving persuasive communication (Petty & Cacioppo, 1986). The premise of the model is that a person who spends more time deliberating over the key messages they are presented with, will ultimately have a greater likelihood of acting on those messages compared to those who process the message more passively. Therefore, a worksheet was devised to encourage elaboration during and after watching the video. Participants were asked to list, (a) "at least five reasons why you think it is important to develop your groupwork skills", (b) "at least five qualities that you think make for an effective group member", and (c) "what you would like to get out of your outdoor residential". In addition, to encourage self-regulation and strengthen the link between intention and action (Gollwitzer, 1999), the final part of the worksheet prompted participants to set themselves three goals to help achieve their course objectives (see online supplementary materials for a copy of this worksheet).

(Table 1)

Measures

Groupwork skills questionnaire (GSQ; Cumming, Woodcock, Cooley, Holland, & Burns, 2014). The ten question GSQ measures students' perceived use of effective groupwork skills. Two five-question subscales measure task (e.g., "clearly define the roles of each group member") and interpersonal (e.g., "provide emotional support to my group members") groupwork skills. At baseline, following the stem "When working in groups I tend to…" participants rated the questions between 1 (*never*) and 5 (*always*). Participants completed the GSQ again at the end of the course using the stem "when working in groups during the course, I…". An average was calculated for each subscale at each timepoint. The GSQ has demonstrated good psychometric properties in related samples (Cumming et al., 2014; Cooley et al., 2016).

Groupwork preference and previous groupwork experience. A measure of participants' preferences for groupwork and previous groupwork experience was included to assess their role as potential confounding variables in the outdoor learning experience. The preference for groupwork subscale was taken from the Work Group Characteristics Measure (Campion, Medsker, & Higgs, 1993). Three questions were rated between 1 (*strongly disagree*) and 5 (*strongly agree*) and averaged (e.g., "If given the choice, I would prefer to work as part of a group rather than work alone."). A further two single questions were developed to measure, "How much of your previous academic experiences have involved working in a group?", between 1 (*none*) and 4 (*all*), and "To what extent have your previous academic groupwork experiences been positive and/or negative?", between 1 (*always negative*) and 5 (*always positive*).

Theory of planned behaviour variables. The TPB questions were developed for the purpose of this study according to recommendations by Ajzen (2016), Francis and colleagues (2004), and Sutton (1998). Three questions were developed for each underlying TPB variable (i.e., instrumental attitude, affective attitude, injunctive norm, descriptive norm, self-efficacy, controllability, and intention; see Appendix A). Each question, for example, "During this course, other people will work hard to improve their groupwork skills" (descriptive norm), were rated on a 7-point scale, between 1 (*strongly disagree*) and 7 (*strongly agree*). An average was calculated for each variable. Perceived behaviour change was measured at the end of the course using two questions (e.g., "During the course I have developed my groupwork skills considerably") on a similar scale to the other TPB questions.

Procedure

Prior to recruitment, each of the seven course iterations was assigned to one of three experimental conditions: video only (n = 73; 3 iterations), video+worksheet (n = 56; 2 iterations), and control (n = 44; 2 iterations). These conditions were randomly distributed evenly across each department's iterations of the course and participants were not aware of the study when choosing which iteration to attend. On the coach to the residential, all participants completed informed consent and a baseline questionnaire, which comprised demographics, groupwork skills, groupwork preferences, previous groupwork experiences, and the TPB variables.

After arriving at the outdoor pursuit centre, participants attended an induction meeting. In the control condition, the outdoor instructors presented the centre's standard PowerPoint slides, which introduced staff, safety information, and provided course recommendations (e.g., to have fun, work together, reflect, and to not worry about making mistakes). The intervention conditions were shown the video following the standard induction. In the video+worksheet condition, participants were presented with the worksheet

before watching the video. To ensure that completing the worksheet whilst watching the video did not distract participants, a few minutes were allocated after the video to complete the worksheet.

At the end of the induction meeting, all participants spent approximately 5 minutes completing the TPB section of the questionnaire for a second time (response rate = 100%). Finally, at the end of the course before returning home, all participants completed a final questionnaire measuring perceived behaviour change and the groupwork skills questionnaire (response rate = 99.6%).

Results

Preliminary Analysis

Screening. Data were cleaned and screened for errors before being checked to ensure the data were suitable for the statistical tests used (i.e., outliers, normality, linearity, multicollinearity, and homoscedasticity; see Tabachnick & Fidell, 2013). Following this inspection, 11 participants were found to have incomplete baseline questionnaires, with their responses to the TPB section missing and thus reducing the sample size in the respective analysis (9 missing in the video+worksheet condition, and 2 in the video condition). Aside from these participants, responses to individual questions were missing in less than 1% of the data and the MCAR test (Little & Rubin, 1987) revealed these to be missing at random, suggesting there were no issues with particular questions. Expectation maximization was therefore used to replace this missing data (i.e., an average taken from related items).

No participants were removed due to univariate outliers. However, across the TPB subscales, five multivariate outliers were identified using Mahalanobis distance (2 control, 1 video, 2 video+worksheet). All five were subsequently removed from the respective analysis, after individual inspection suggested they were not reflective of the population (i.e., responses followed a random pattern rather than reflecting extreme scores; Tabachnick &

Fidell, 2013). All variables were reasonably normally distributed, apart from perceived behaviour change, which was strongly negatively skewed. However, following transformation (reflect and inverse), normality was subsequently improved for this variable.

Questionnaire reliability. The measures and subscales all had adequate internal reliability, with composite reliability scores ranging from .79 to .95 (CR ≥.70; Hair, Black, Babin, & Anderson, 2010). In addition, confirmatory factor analysis (AMOS 22.0) confirmed that questionnaires had an acceptable fit with their respective variables measured and no items required removal (Table 2).

(Table 2)

Baseline differences. Separate one-way analysis of variance (ANOVA), multivariate ANOVA (MANOVA), and Chi Square tests were used to check for between-condition differences at baseline. There were no significant differences in sex, student origin (domestic vs. European vs. International), and first language (English vs. other) (p >.05). However, participants in the control condition were significantly younger (p < .01) than both the video and video+worksheet conditions by approximately 1 year (*M[SD]* = 21.89[1.91], 23.13[2.23], and 23.32[2.88], respectively). Age was therefore entered into subsequent tests as a covariate to ensure that its effect was removed from the comparisons made.

There was also a significant difference between conditions at baseline in the extent to which participants' previous academic experiences had involved groupwork. Although all conditions scored between 2 (*some*) and 4 (*a great deal*) for this variable, the control conditions scored significantly lower (p < .01) than the video and video+worksheet conditions (*M[SD]* = 2.69[0.87], 3.34[0.79], and 3.42[0.74], respectively), which was also controlled for in the subsequent analysis. There was, however, no significant difference in the extent that these previous groupwork experiences had been positive or negative, with all

three conditions scoring between 3 (*just as often negative and positive*) and 4 (*mostly positive, rarely negative*) ($M = 3.82$, $SD = 0.47$).

As shown in Figure 1, baseline scores for the TPB variables were already at the higher end of the scale for all three conditions, indicating that participants' already had positive attitudes, subjective norms, perceived behavioural control, and learning intentions before the course began. Scores for the task and interpersonal groupwork subscales were also high at baseline, suggesting that participants already felt they displayed effective behaviour when working in groups. These high baseline scores for the TPB and GSQ were unsurprising due to these particular residential courses being voluntary, with a number of students declining to attend or being absent on the day. There were, however, no differences between conditions across the TPB and GSQ subscales at baseline ($p > .05$).

Change in groupwork skills

A repeated measures MANOVA was used to test whether the programme resulted in an increased frequency of effective task and interpersonal groupwork behaviour. There was a significant multivariate effect over time, $F(2, 168) = 30.94$, $p < .001$, with a large effect size ($\eta_p^2 = .27$). Univariate tests revealed mean scores in the task subscale increased significantly from 3.76 ($SD = 0.59$) to 4.07 ($SD = 0.54$), $F(1, 169) = 41.43$, $p < .001$, $\eta_p^2 = .20$, and from 3.96 ($SD = 0.59$) to 4.22 ($SD = 0.53$) in the interpersonal subscale, $F(1, 169) = 44.99$, $p < .001$, $\eta_p^2 = .21$.

Main Analysis

Relationship between TPB variables (H_1). To test the predictions of the TPB within the context of outdoor learning, post-induction measures of the TPB variables were collapsed across the three conditions and entered into a hierarchical multiple regression (HMR). The first HMR assessed the ability of the TPB variables to predict learning intention (Table 3). The control variables were entered in Step 1 and TPB variables in Step 2. After

the first run of the analysis, non-significant control variables were removed from the model (Cohen, Cohen, West, & Aiken, 2002). In support of H_1, the overall model was significant, $F(4, 164) = 118.03$, $p < .001$, and accounted for 74.7% of the variance in scores for intention (adj $R^2 = .74$). Preference for groupwork at Step 1 positively predicted learning intention and accounted for a significant amount of variance. However, the addition of instrumental attitude, descriptive norms, and self-efficacy in Step 2 accounted for the majority of variance, $F_{change}(3, 160) = 122.92$, $p < .001$ (Table 3).

A second HMR was used to assess the ability of the TPB variables to predict levels of perceived behaviour change measured at the end of the outdoor residential. In support of H_1, the overall model (Table 3) was significant, $F(3, 162) = 12.55$, $p < .001$, and accounted for 19.1% of the variance in scores for perceived behaviour change (adj $R^2 = .18$). Preference for groupwork was, again, a positive predictor and the only significant control variable in Step 1. The addition of intention and self-efficacy in Step 2 accounted for the majority of variance, $F_{change}(2, 160) = 12.41$, $p < .001$.

(Table 3)

Change in TPB variables (H_2). A 2 (time) by 3 (condition) mixed-method multivariate analysis of covariance was conducted to examine the effect of the video conditions on the TPB variables. Previous groupwork experience and age were both controlled for due to the baseline differences identified between conditions. To reduce the chance of false positive findings occurring by chance due to the multiple tests used (i.e., a type 1 error), a Bonferroni adjusted alpha level of .007 was applied at a univariate level.

A significant multivariate main effect was found showing scores for the TPB variables improved from pre- to post-induction, $F(7, 140) = 2.41$, $p = .02$, with a large effect size ($\eta_p^2 = .11$). There was also a significant time-by-group multivariate interaction, $F(14, 280) = 2.08$, $p = .01$, with a medium to large effect size ($\eta_p^2 = .09$), showing that the these

improvements across time points differed between the control and intervention conditions. Univariate interactions are presented in Figure 1 and, in support of H_2, indicate greater improvements in the TPB variables for the video and video+worksheet conditions.

(Figure 1)

Relationship between changes in TPB variables and changes in groupwork behaviour (H_3). A HMR was used to assess the degree to which the change in TPB variables from pre- to post-induction, predicted changes in task and interpersonal groupwork skills. Demographics and previous groupwork experience were controlled for in Step 1, change scores for intention, self-efficacy and controllability were entered in Step 2, change scores for attitudes (attractive and instrumental) and subjective norms (injunctive and descriptive) were entered in Step 3, and dummy variables for the video (0 = no video and 1 = video) and worksheet (0 = no worksheet and 1 = worksheet) conditions were entered in Step 4. After the first run of the analysis, Step 1 was removed as no control variables accounted for a significant amount of variance.

For the change in task groupwork skills, the overall model was not significant, $F(9, 152) = 0.93$, $p = .50$, and neither were any of the individual steps nor individual predictor variables. Similarly, for the change in interpersonal groupwork skills, the overall model was not significant, $F(9, 152) = 0.53$, $p = .85$, and neither were any of the individual steps nor individual predictor variables. These findings reject H_3 and suggest that the changes in TPB variables following the intervention were not related to subsequent groupwork development.

Discussion

Many of the participants in the present study began the residential course with positive perceptions of their previous groupwork experiences and abilities. Despite these high baseline scores, the outdoor learning course successfully increased participants' task and interpersonal groupwork behaviour. This finding is in line with previous research showing

outdoor learning to be a successful approach to groupwork development (for reviews see; Cooley, Burns, & Cumming, 2015; Gillis & Speelman, 2008; Hattie, Marsh, Neill, & Richards, 1997). Also in line with the TPB literature, and in support of H_1, the TPB model accounted for a significant degree of variance in intentions and behaviour change within the context of groupwork development through outdoor learning. This finding alone provides a strong rationale for developing positive TPB related thoughts and feelings prior to an outdoor learning experience.

In relation to H_2 and the primary aim of the study, a video that was designed according to the theory of planned behaviour (TPB; Ajzen, 1991) and shown prior to the learning experience, was found to positively influence attitudes, subjective norms, perceived behavioural control, and learning intentions towards that experience. In support of the elaboration likelihood model (Petty & Cacioppo, 1986), Figure 1 shows the video's impact on the TPB variables was even greater when used alongside a worksheet designed to encourage deliberation and goal setting. The positive impact of the pre-course video on TPB variables is encouraging, particularly given that previous health behaviour interventions succeed in changing TPB variables only some of the time (Hardeman et al., 2002; Sniehotta et al., 2014). It is also important to note that these improvements in TPB variables in the present study were obtained in a group of higher education students who self-selected onto the learning experience and already held positive beliefs at baseline. These high baseline scores in the TPB variables, however, resulted in a probable ceiling effect, where the subsequent improvements were small in their absolute values.

These small, yet meaningful, improvements in TPB variables were not related to the changes in groupwork behaviour identified at the end of outdoor learning, leading to the rejection of H_3. An intervention that succeeds in improving the TPB variables yet fails to influence behaviour is not uncommon in the health literature (e.g., Chatzisarantis & Hagger,

2005; Sniehotta, 2009). It is possible that the improvements in TPB variables resulting from the video were simply not large enough to be detected in the course outcomes over and above that of other competing factors (Sniehotta et al., 2011). That is, whilst instrumental attitudes, descriptive norms, and self-efficacy together accounted for a large proportion of variance in participants' learning intentions (i.e., 58%), self-efficacy and intention only accounted for a small amount of variance in reported behaviour change (i.e., 13%, when excluding the contribution of preference for groupwork). A degree of variance is therefore inevitably accounted for by factors other than those within the TPB (McEachan et al., 2011).

As the TPB is a volitional model of behaviour change, its predictor variables are tied to rational reasoning (Sheeran, Gollwitzer, & Bargh, 2013). As a result, there may be a number of unconscious influences on behaviour that are not accounted for by the TPB. Within outdoor learning, the learning environment is known to be rich, engaging, and transformative, which may influence learners' behaviour beyond their level of consciousness (D'Amato & Krasny, 2011; Gass & Stevens, 2007). Indeed, the model of optimal learning and transfer (MOLT; Cooley, Cumming et al., 2015), which was developed in the context of outdoor learning, describes a range of other potential influences of behaviour change during outdoor learning such as being taken outside of your comfort zone, the novel environment, perceived instructor support, experiential learning, and the quality of guided reflection. When outdoor learning is delivered optimally, it has the ability to grip learners and bring about learning even when the learner had not previously intended to or believed they could learn from the experience (Cooley, Cumming et al., 2015; D'Amato & Krasny, 2011).

Another unconscious influence on behaviour is a person's habits, which sometimes act against our volition (Gardner, De Bruijn, & Lally, 2011). For example, it is possible for a learner to have positive attitudes towards groupwork and favourable intentions towards developing their groupwork behaviour, yet each time they find themselves in a group

situation they succumb to their interpersonal habits (e.g., social loafing or not considering other peoples' points of view; Aggarwal & O'Brien, 2008).

Due to these other potential influencers of behaviour that may be acting alongside the TPB variables, research has shown that large improvements in TPB variables are needed to significantly influence behaviour (Webb & Sheeran, 2006). As such, it is understandable that the small improvements resulting from the video in the present study were not detected in the behavioural outcomes. Future research may therefore wish to consider the impact of such a video on learners who are taking part in a compulsory learning experience and who are less willing to participate (i.e., those who score themselves much lower at baseline in the TPB variables; Appendix A). In these participants, there would be more scope for their TPB-related beliefs to be improved by a pre-course video. Such a study would enable us to distinguish whether the lack of influence on learning observed in the present study was down to a ceiling effect or the effect of the TPB variables on behaviour change being limited. It would also be of interest to further explore the impact of a pre-course video in a learning environment that is typically less engaging than outdoor learning, such as a classroom setting, where learning is more didactic rather than experiential, and where learning outcomes are hard skills rather than soft skills.

The timing of the pre-course video is also an important consideration. In the present study, the video was shown once participants had arrived at the residential course. For practical reasons, this timing enabled the researchers to ensure all participants received their intended intervention condition. However, at this point in time, some participants were likely to have already progressed through the 'pre-contemplation', 'contemplation', and 'preparation' stages of behaviour change, and were now into the 'action' phase (Prochaska et al., 1992). According to this process model of behaviour change, once the action phase is reached, a person typically feels motivated towards achieving their goals and therefore a

motivational intervention at this point will have less impact than in previous phases (Prochaska & Velicer, 1997). The video was therefore likely to have had greatest impact on those participants who, despite having arrived at the residential, were still at the earlier stages of behaviour change and less willing to engage.

The timing of the video also meant that those who decided not to attend the residential, and who may have benefitted most from the video, did not receive the intervention. A longitudinal study could investigate the impact of a pre-course video during these earlier phases of the transtheoretical model, before participants have arrived at the outdoor pursuit centre, and the influence this has on recruitment and engagement of those who may not have ordinarily attended.

The present study provides a useful protocol for providers of outdoor learning experiences who wish to better prepare individuals before a course or expedition. That is, the TPB questionnaire developed in the present study (Appendix A) could be used to identify the lowest scoring variables as well as the strongest predictors of intention and behaviour change within a given learning context. A video intervention could then be specially designed to target these areas rather than addressing all variables equally as in the present study. For example, in the present study it was instrumental attitudes that predicted learning intentions and not affective attitudes; therefore, the video could have placed more emphasis on the benefits of attending the course than on the affective experiences. Similarly, as descriptive norms was a significant predictor and not injunctive norms, the video could have emphasised the efforts other students are likely to make on the course, and less so on the expectations of significant others such as the university staff. This more targeted approach to video design could have a more profound impact.

Conclusion

The present study is the first to test the effect of a theoretically based video used prior to an outdoor learning experience. In doing so, this study provides a systematic framework for designing and testing pre-course videos. The findings demonstrate that positive behaviour change occurring through outdoor learning is indeed predicted by learners' prior attitudes, subjective norms, perceived behavioural control, and learning intentions. These TPB variables were significantly improved by the TPB-based video, even though learners already began with favourable beliefs. However, these high baseline scores meant that improvements in the TPB variables were small, and not enough to impact the subsequent learning outcomes. Further research may wish to test pre-course videos in populations that are harder to engage and where TPB variables are less favourable at baseline.

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Appendix A

The Theory of Planned behavior Questionnaire

You should respond to each sentence using the scale on the right hand side and circling the appropriate number. **There are no right or wrong answers, so please answer honestly.** Some sentences may appear similar but please respond to all statements by circling the appropriate number

Attitude (Affective = items 2, 4, 6; Instrumental = items 1, 3, 5)

	Strongly disagree						Strongly agree
1. Attending this course to develop my groupwork skills will **be useful**	1	2	3	4	5	6	7
2. Attending this course to develop my groupwork skills will **be pleasant**	1	2	3	4	5	6	7
3. Attending this course to develop my groupwork skills will **be valuable**	1	2	3	4	5	6	7
4. Attending this course to develop my groupwork skills will **be interesting**	1	2	3	4	5	6	7
5. Attending this course to develop my groupwork skills will **be a good use of time**	1	2	3	4	5	6	7
6. Attending this course to develop my groupwork skills will **be enjoyable**	1	2	3	4	5	6	7

Subjective norms (Injunctive = items 7, 9, 11; Descriptive = items 8, 10, 12)

	Strongly disagree						Strongly agree
7. People who are important to me **think that I should** attend this course to develop my groupwork skills	1	2	3	4	5	6	7
8. During this course**, other people will improve** their groupwork skills	1	2	3	4	5	6	7
9. People who are important to me **want me** to attend this course to develop my groupwork skills	1	2	3	4	5	6	7
10. During this course, **other people will consider how to develop** their groupwork skills	1	2	3	4	5	6	7
11. People who are important to me **expect me** to attend this course to develop my groupwork skills	1	2	3	4	5	6	7
12. During this course, **other people will work hard** to improve their groupwork skills	1	2	3	4	5	6	7

Perceived behavioral control (Self-efficacy = items 13, 15, 17; Controllability = items 14, 16, 18)

	Strongly disagree						Strongly agree
13. For me, if I wanted to develop my groupwork skills on this course, **it would be easy**	1	2	3	4	5	6	7
14. Whether or not I am able to develop my groupwork skills on this course **is entirely up to me**	1	2	3	4	5	6	7
15. **If I wanted to, I could develop** my groupwork skills on this course	1	2	3	4	5	6	7
16. **There are no barriers** outside of my control that will prevent me from developing my groupwork skills on this course	1	2	3	4	5	6	7
17. **I am confident that I can** develop my groupwork skills on this course if I want to	1	2	3	4	5	6	7
18. Whether or not I am able to develop my groupwork skills on this course **is within my control**	1	2	3	4	5	6	7

Intention

	Strongly disagree						Strongly agree
19. **I plan to** develop my groupwork skills on this course	1	2	3	4	5	6	7
20. **I will try to** develop my groupwork skills on this course	1	2	3	4	5	6	7
21. **I intend to** develop my groupwork skills on this course	1	2	3	4	5	6	7

Perceived behavior change

	Strongly disagree						Strongly agree
22. During the course I have developed my groupwork skills considerably	1	2	3	4	5	6	7
23. My groupwork skills are considerably better now than when I arrived at the centre	1	2	3	4	5	6	7

Note: the item order was mixed across the TPB subscales.

Table 1

Example video content and associated theoretical constructs

Video storyline		Example section of the video	Associated theoretical construct
Before residential	Careers advisor interview	Discussing prevalence of groupwork in higher education	• Injunctive norms • Instrumental attitudes
	Statistics	Students who receive groupwork training achieve higher grades in academic group projects (Prichard, Stratford, & Bizo, 2006)	• Instrumental attitudes
	Alumni interviews	Reflecting on the value of academic groupwork, the barriers sometimes faced (e.g., negative attitudes, social loafing) and how they can be overcome through practice	• Descriptive norms • Self-efficacy • Controllability
	Clips of students engaging in academic groupwork	In the classroom, sports field and lab practical classes	• Affective attitudes • Behavioural modelling
	Careers advisor interview	Discusses employer demand for groupwork skills, supported by statistical evidence (Bennett, 2002), as well as evidence from graduate surveys (CBI, 2009).	• Injunctive norms • Instrumental attitudes • Descriptive norms
During the residential	Clips of beautiful scenery	Mountain and lake views	• Affective attitudes
	Clips of different activities	Ranging from ice-breakers to obstacle courses and canoeing	• Affective attitudes • Behavioural modelling
	Instructor interview	Discussing the main challenges faced (e.g., unfamiliarity with people and environment, being outside of comfort zone), reassuring concerns (e.g., swimming ability, inexperience in outdoors) and describing the supportive staff and team environment	• Self-efficacy • Controllability
	Student interviews	Students discuss experiences of growth (e.g., time management, trust, communication, teamwork skills, confidence), involvement in managing the centre, the enjoyment of working together and meeting new people, and the potential benefits of what they have learnt for when they return to university	• Instrumental attitudes • Injunctive norms • Self-efficacy • Controllability • Affective attitude
	Academic staff interview	Discusses course benefits and skills transfer	• Instrumental attitudes • Injunctive norms
Back at university campus	Student interviews	Discussing their ability to transfer learning despite environmental barriers	• Self-efficacy • Controllability

Academic staff interview	Discussing observations of improved student groupwork since returning from the residential and the benefits to employability	• Instrumental attitudes • Injunctive norms
Student interview	Discusses enjoyment and how to get the most out of the experience	• Affective attitudes • Controllability
Photo collage	Photos from different outdoor activities	• Affective attitudes

Note. Different sections of the video may serve multiple constructs of the TPB (Ajzen, 1991) depending on how they are perceived by each individual observer.

Table 2
Assessment of model fit for the questionnaire scales used

Variable	# of items	χ^2	df	x^2/ df	SRMR	RMSEA	TLI	CFI	Standardized factor loadings
Groupwork skills questionnaire (Time 1)	10	46.50*	32	1.45	.05	.05	.96	.97	.53-.81
Groupwork skills questionnaire (Time 2)	10	48.78*	33	1.48	.05	.05	.96	.97	.54-.78
TPB questionnaire (Time 1)	21	346.77*	173	2.01	.04	.08	.93	.94	.47-.90
TPB questionnaire (Time 2)	21	283.55*	171	1.66	.05	.06	.95	.96	.57-.87
Conservative		$p > .05$		< 2.0	< .05	< .06	≥ .95	≥ .95	
Acceptable		$p < .05$*1		< 5.0	< .08	< .07	≥ .90	≥ .90	> .40

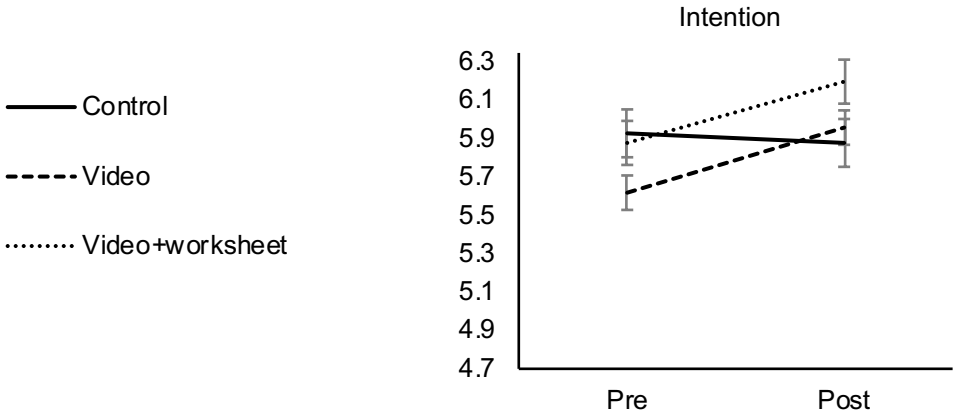
Note χ^2 = Chi-Square; df = degrees of freedom; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; TLI = Tucker–Lewis Index; CFI = comparative fit index; ** $p < .001$. Conservative and acceptable values are taken from Byrne (2009), Hu and Bentler (1999), Marsh, Hau, and Wen (2004), Steiger (2007), and Tabachnick and Fidell (2013). *1 Whilst a good model fit is normally indicated by a non-significant χ^2, this statistic has a number of limitations and therefore the x^2/df is recommended as an alternative indicator (Tabachnick & Fidell, 2013).

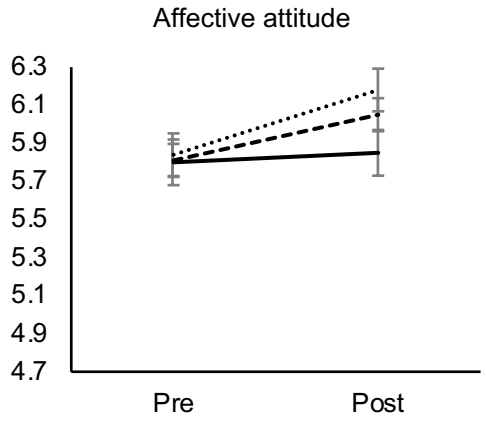
Table 3

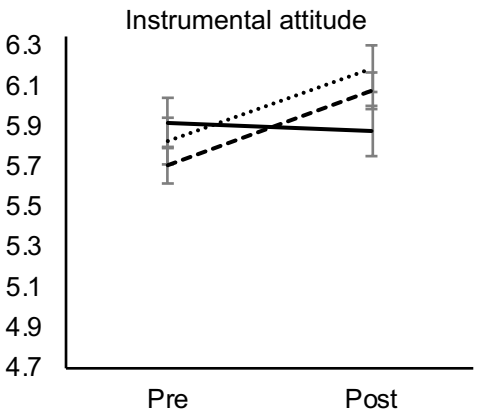
A summary of the hierarchical regression analyses for the TPB

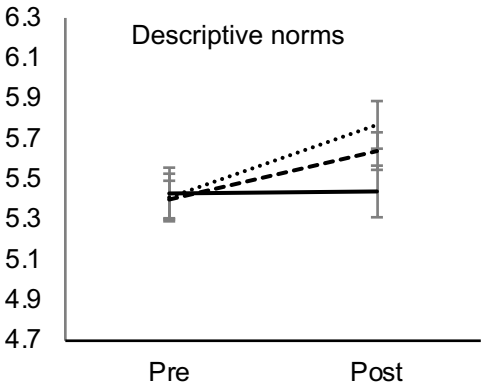
					95% Confidence Interval	
	ΔR^2	*B*	β	*t*	Lower bound	Upper bound
Intention						
Step 1	.16***					
Preference for groupwork		.43	.40	5.65***	.28	.58
Step 2	.58***					
Preference for groupwork		.08	.08	1.80	-.01	.17
Instrumental attitude		.60	.59	9.44***	.48	.73
Descriptive norm		.15	.15	2.65**	.04	.26
Self-efficacy		.18	.17	2.89**	.06	.31
Perceived behaviour change						
Step 1	.07**					
Preference for groupwork		.30	.26	3.35**	.12	.47
Step 2	.13***					
Preference for groupwork		.13	.11	1.45	-.05	.31
Intention		.23	.21	1.98*	.01	.45
Self-efficacy		.24	.21	2.07*	.01	.47

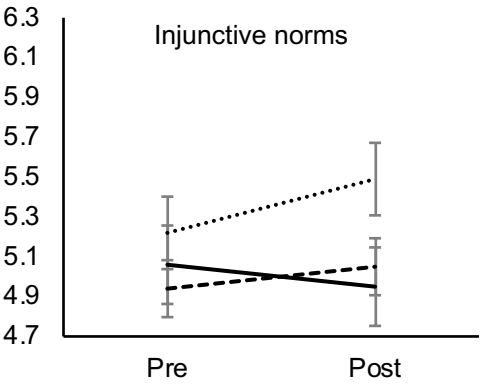
Note. * $p < .05$, ** $p < .01$, *** $p < .001$; ΔR^2 = Change in R^2; *B* = unstandardized beta coefficient; β = standardized beta coefficient.

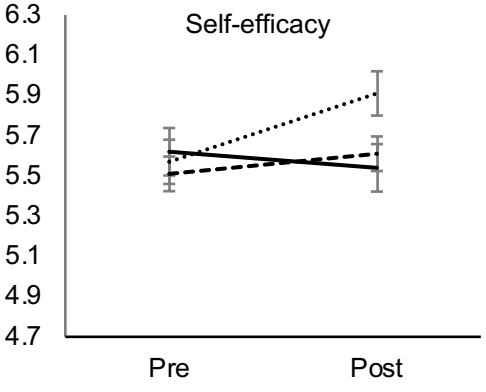

Control
Video
Video+worksheet
Intention
6.3
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
Pre
Post


Affective attitude
6.3
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
Pre
Post


Instrumental attitude
6.3
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
Pre
Post


Descriptive norms
6.3
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
Pre
Post


Injunctive norms
6.3
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
Pre
Post


Self-efficacy
6.3
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
Pre
Post

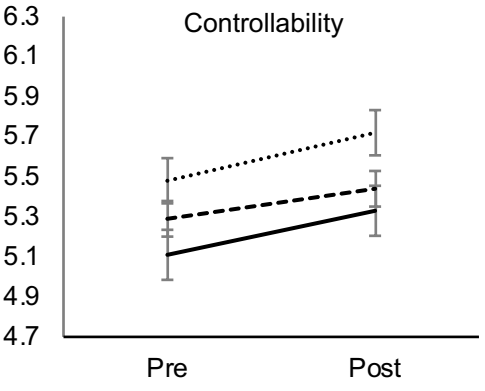

Controllability
6.3
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
Pre
Post

Figure 1: The effect of the video intervention on TPB variables with standard error and univariate interactions presented. A Bonferroni correction (p = .007) is applied.

Supplementary material

Theory of planned behaviour based video

https://www.youtube.com/watch?v=fs5aljUJ29s

This video was developed in the present study and shown to participants prior to embarking on a residential groupwork skills course.

Video worksheet

Based on the information you receive in the video please answer the following questions:

1. Please list **at least 5 reasons** why you think it is important to develop your groupwork skills.
   a)_____
   b)_____
   c)_____
   d)_____
   e)_____

2. Please list **at least 5 qualities** that you think make for an effective group member.
   a)_____
   b)_____
   c)_____
   d)_____
   e)_____

3. Please list what you would like to get out of your time on this course.
   _____
   _____
   _____
   _____

4. Now set yourself three goals to help you achieve these objectives. These should be specific and achievable (for example, *I will contribute at least one idea to each groupwork task* or *I will to listen to everyone's ideas before volunteering your own*).

   a)

   b)

   c)

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Disclosure statement

No conflicts of interest have been identified in the production on this research.

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Dr. Sam J. Cooley is a Chartered Psychologist with the British Psychological Society and holds a Ph.D. in sport and exercise psychology. He is an associate research fellow at the University of Birmingham as well as a trainee clinical psychologist at the University of Leicester. His research interests are in positive youth development and the use of natural environments, experiential learning, and strengths-based approaches in the development of social and emotional well-being.

Dr. Frank F. Eves is a Reader in public health psychology at the University of Birmingham. Frank pioneered the use of prompts in community settings to increase lifestyle physical activity. This translational research uses psychological theory to optimise the response to 'nudge' interventions at a population level.

Dr. Jennifer Cumming is a Reader in sport and exercise psychology at the University of Birmingham and is a Chartered Psychologist and Associate Fellow of the British Psychological Society. Her current research focuses on community-based approaches to developing practical and culturally-tailored interventions for athletes and, more recently, individuals who are traditionally considered 'harder to reach'.

Dr. Victoria E. Burns is a Reader in science education, with a special interest in how we can support students to develop the knowledge, skills and attributes that they need to be effective, educated citizens. She uses experiential learning, innovative assessments, and extracurricular activities, to give students opportunities to connect theory to practice, learn to communicate effectively with different audiences, and promote intercultural understanding.