PREDICTORS OF PARTICIPANT DEVELOPMENT THROUGH ADVENTURE PROGRAMS: REPLICATION AND EXTENSION OF PREVIOUS FINDINGS FROM NOLS

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Background

Research in adventure programs is a relatively new phenomenon, with much of it dating back only to the late 1960s and early 1970s. Yet, recently scholars have indicated that research in this area is maturing (Hattie, Marsh, Neill & Richards, 1997; Baldwin, Persing & Magnuson, 2004). The research is moving from primarily documenting program outcomes to more of a focus on understanding the program and participant characteristics that contribute to those outcomes. Indeed, recent meta-analyses (e.g. Hattie et al., 1997) and "state of knowledge" reviews of research (e.g. Ewert & McAvoy, 2000) have not only presented what we currently know about adventure program outcomes, but have also called for increased research on the specific participant characteristics and program mechanisms that provide the opportunities for participant development.

Some researchers have recently turned attention to exploring the links between program components and outcomes. Consider, for example, Daniel examining a spiritually-oriented program (2003); McKenzie focusing on youth in Outward Bound Western Canada (2003); Goldenberg, McAvoy, and Klenosky studying an Outward Bound youth program (2005); Sibthorp, Paisley, and Gookin studying the National Outdoor Leadership School (2007); McAvoy, Holman, Goldenberg, and Klenosky studying Wilderness Inquiry's program with persons with disabilities (2006); and Gassner's study of adults in Outward Bound Singapore (2007). These studies range across program types, participants, locales, and goals.

One "theoretical" approach to adventure program research, proposed by Baldwin et al., (2004) is to construct a program-driven and program-specific theory or model of change relevant to a specific structure, population, and intent. Baldwin et al. term this the theory-program-outcome model approach, developed from the previous work of Hamilton (1980). As an early example of this approach to understanding program components and outcomes, Walsh and Golins (1976) developed an adventure education process model for Outward Bound that helped to explain some of the program and participant factors that contribute to participant development. Sibthorp (2003) and McKenzie (2003) explored specific adventure education programs to determine the extent to which the Walsh and Golins process model was valid. Both studies found some support for the model, but both encouraged researchers to move beyond Walsh and Golins to develop more complete process models that include additional participant characteristics and program

components. The study reported here used the theory-program-outcome approach to study the relationships between participant characteristics, program components, and program outcomes.

This study continues the examination of one of the largest and most established adventure education programs in the world, the National Outdoor Leadership School (NOLS). Founded in 1965, NOLS has developed 11 branches worldwide and has graduated over 75,000 students. NOLS was originally known as a wilderness skills school, but quickly expanded their program goals and emphases to include leadership training, communication skills, expedition behavior, environmental awareness, and safety and judgment. NOLS courses include those for youth, adults, and intact groups who contract with NOLS for topic-specific courses. Courses range from eight days to months long semester courses. College credit is also available for some courses.

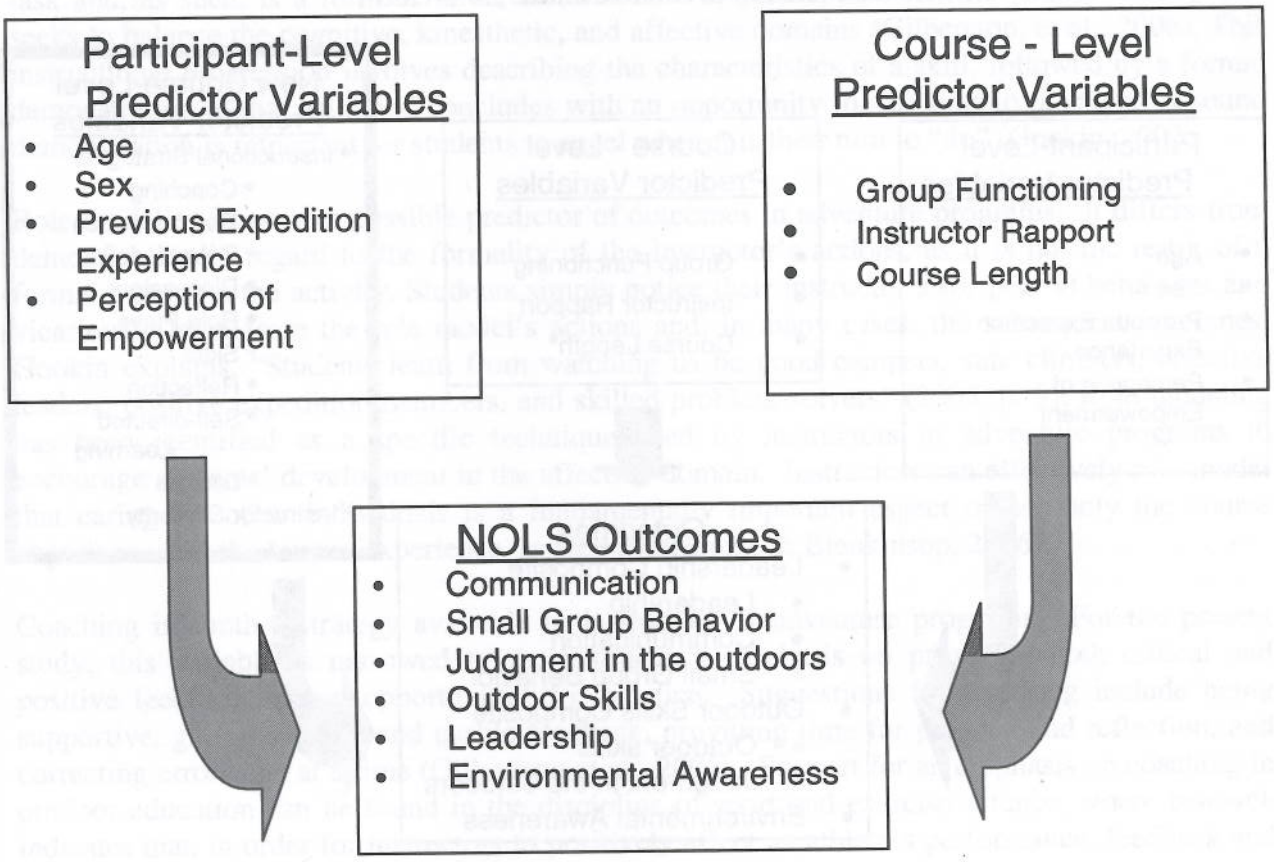
As part of an on-going relationship between the University of Utah and NOLS, the study reported here is part of a series of efforts to develop and test a predictive model that would increase understanding of the relationships between participant characteristics, program components, and program outcomes for NOLS specifically. Such a predictive model would help explain how the NOLS process produces outcomes and how that process might be modified to produce additional or different outcomes. The model may also assist other adventure programs in better understanding how their programs produce outcomes.

However, there are, undoubtedly, differences in program components across adventure programs, and so one has to be cautious about applying a model from one program to another. As examples, Outward Bound courses typically include the components of outdoor activities, natural environment, personal reflection, group debriefing, community service, solo, personal challenge, final expedition, and course instructors (Gassner, 2007; Goldenberg et al., 2005). Wilderness Inquiry trips, in contrast, usually include the course components of outdoor activities, group challenges, group interaction, social integration, wilderness or natural environment, and program staff. In addition, the populations served by these, and other programs, are distinctly different. While some obvious overlap exists among adventure programs, the differences are important.

The initial study at NOLS, reported in a recent article by Sibthorp, Paisley, and Gookin (2007), developed a preliminary predictive model to explain the relationship between selected participant characteristics, program components and program outcomes at NOLS (see Figure 1). The course outcomes in the model were identified through a content analysis of NOLS course objectives and interviews with NOLS staff and students. The potentially important variables (participant characteristics and course components) that may be important in developing those target outcomes were established through a review of literature (e.g. Ewert & McAvoy, 2000; McKenzie, 2003; Sibthrop, 2003) and through interviews with senior NOLS staff and instructors.

FIGURE 1

Original predictive model for NOLS

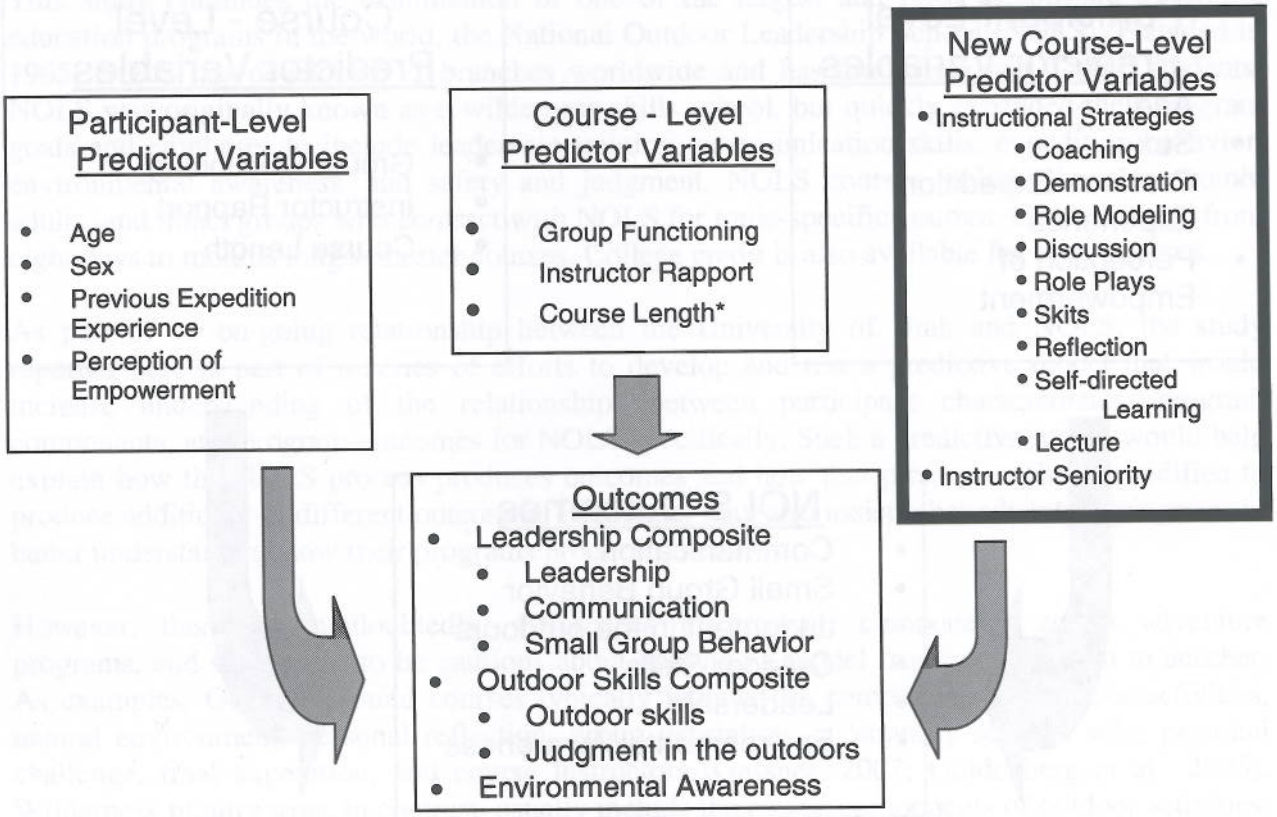


Data for the initial study was collected from 596 students on NOLS courses in 2004 using a retrospective-pretest posttest instrument developed for the study. The instrument measured the variables shown in the model in Figure 1. The initial study found preliminary support for this model, but also left a significant amount of unexplained variance, implying that some additional participant and course component predictors were not included in this initial study. One of the recommendations from the initial study was to replicate the study with a larger sample of NOLS participants and to include additional participant and/or course component variables in the model.

The overall purpose of this current study, then, was to examine the relationships between selected participant characteristics, program component variables, and program outcomes at NOLS. This is a replication of the earlier study with an expanded sample. In addition, this study extends the program component variables to include an investigation of the impact of instructional strategies employed by course leaders on student learning. Further, this study includes data from instructor teams, a methodological extension, and examines the impact of course length using a subset of NOLS courses. Figure 2 represents the extension aspects of the present study. Such replication and extension of previous studies is seldom conducted, but remains critical to the process and rigor of understanding social phenomena (e.g. McMillan & Schumacher, 1997).

FIGURE 2

Extension of predictive model for NOLS



**During this iteration, course length was not included in the hierarchical model, but was analyzed separately to address confounding variables.*

New Course-level Predictors

To extend previous work, this study sought to identify additional course-level variables that may account for some of the unexplained variance in the original model by Sibthorp, Paisley, and Gookin (2007). Eight specific instructional strategies, in addition to the instructor characteristic of recognized weeks of field experience at NOLS (a proxy measure for experience), were identified as course-level components potentially influencing student outcomes. The instructional strategies endorsed by current adventure program literature include demonstration, role modeling, coaching, discussion, lecture, reflection, skits and role plays, and instruction allowing for self-directed learning (Gilbertson, Bates, McLaughlin, & Ewert, 2006; Martin, Cashel, Wagstaff, & Bruenig, 2006; Gookin, 2003). A review of empirical research in the field of adventure programming and related fields, such as general education, psychology, and sport and exercise science, revealed further support for the implementation of the above instructional techniques in the outdoor context (i.e. Bobilya, McAvoy, and Kalish, 2003; Hodges & Franks, 2002; Carrol & Bandura, 1982, 1985, 1987).

Demonstration is a prevalent technique utilized by adventure-based educators to influence course outcomes (Gookin, 2003). It is the intentional act of overtly teaching a learner how to perform a task and, as such, is a form of direct instruction. "Describe, *demonstrate* [italics added], do" seeks to balance the cognitive, kinesthetic, and affective domains (Gilbertson, et al., 2006). This instructional progression involves describing the characteristics of a skill, followed by a formal demonstration of that skill, and concludes with an opportunity for students to practice. A sound demonstration is important for students to excel when it is their turn to "do" (Gookin, 2003).

Role modeling is another possible predictor of outcomes in adventure programs. It differs from demonstration in regard to the formality of the instructor's actions, as it is not the result of a formal lesson on the activity. Students simply notice their instructor's (or peer's) behaviors and vicariously learn from the role model's actions and, in many cases, the subsequent outcomes. Gookin explains, "Students learn from watching us be good campers, safe climbers, effective leaders, positive expedition members, and skilled problem-solvers" (2003, p. 9). Role modeling has been identified as a specific technique used by instructors in adventure programs to encourage students' development in the affective domain. Instructors can effectively role model that caring for other individuals is a fundamentally important aspect of not only the course experience, but the human experience, as well (McKenzie & Blenkinsop, 2006).

Coaching is another strategy available to instructors of adventure programs. For the present study, this variable is narrowed to the instructor's emphasis on providing both critical and positive feedback during opportunities for practice. Suggestions for coaching include being supportive, giving specific and usable feedback, providing time for practice and reflection, and correcting errors one at a time (Gilbertson et al., 2006). Support for an emphasis on coaching in outdoor education can be found in the discipline of sport and exercise science, where research indicates that, in order for instructors to positively affect an athlete's performance, feedback and ongoing support must be timely and direct. In addition, critical feedback encourages students to try new behaviors in their subsequent attempts. Research findings indicate additional instruction through coaching encourages more effortful practice and avoids the inaccurate processing of feedback (More & Franks, 1996; Hodges & Franks, 2002).

Discussion, as an instructional strategy, is conceptualized in various ways throughout adventure programming literature. One approach involves a process guided by the instructor who poses questions, problems, or issues that need attention in order to facilitate the construction of meaning. Priest and Gass define discussion as "an unstructured form of debriefing that permits clients to analyze past experience and to transfer learning from their adventures to their future lives" (2005, p. 198). Other uses of the method include the creation of opportunities for conversation among participants, without the direct involvement of the instructor, through the use of dyads or small groups of three and four with the intention of creating an atmosphere for exploring ideas (Gilbertson et al., 2006; Martin et al., 2006). Qualitative research findings indicate that one-on-one "discussions" between the instructor and students were "critical" (p. 42) in the students' clarification of their experiences (Bobilya, McAvoy, & Kalisch, 2005). Regardless of the design, findings from research over the previous 50 years indicate that discussion encourages students to pay attention, think actively, and remember material when it is needed later (McKeachie & Svinicki, 2006).

Another course-level instructional strategy is the traditional, didactic approach of lecture, or the direct dissemination of information from an instructor to the participants. Lecture is a useful tool for focusing on key concepts, principles or ideas, providing a conceptual framework, and summarizing material. Effective techniques utilized within a lecture include providing examples which move from concrete to abstract, periodic summaries, checks for understanding, the use of enthusiastic behaviors, and pro-actively maintaining student attention (Murray, 1997; McKeachie & Svinicki, 2006; Brown & Atkins, 1987). McKeachie and colleagues (1990) suggest that lecture, in traditional educational settings, remains one the classic methods employed to relay information, transfer knowledge, and to develop problem solving and motivation. In the realm of adventure programming, lecture is included as a useful, though limited, tool when time is the most important consideration, students have no experience, or when factual information needs to be presented (Drury, Bonney, Berman, and Wagstaff, 2005).

Moving toward a more student-centered approach, reflection as a means to create opportunities in student learning is a pervasive technique found in adventure texts (e.g. Martin, Cashel, Wagstaff, & Bruenig, 2006). Priest and Gass (1999, 2005) identify reflection as an instructional method which assists students in gaining meaning from the experience. It is the key to deeper learning that eventually leads to lasting change. From a theoretical perspective, it is a cognitive process through which a learner assigns a mental value or meaning to information from an experience (Kolb, 1984). Ultimately, reflection can take on many forms including guided debriefing, journal writing, group discussion, and solos (Hoban, 1999; Sugerman, Doherty, Garvey, & Gass, 2000; Knapp, 1999).

The use of role plays or skits is an instructional strategy available within adventure programs to promote participant development. These activities challenge students to participate by acting a part in simulated scenarios or acting out a humorous situation which may, ultimately, provide an opportunity for learning in a controlled setting (Martin, et al. 2006). Sheldon (1996), in an examination of the use of skits and role-playing in a traditional classroom setting, found that participants perceived role playing as, "enjoyable and helpful for learning or remembering the material" (p. 115). Sheldon also notes the nature of the tasks required students to cooperate and communicate, and were successful in engaging shy students even though they may have taken on a non-speaking role. When used appropriately, skits and role plays may be an effective facilitator of participant development.

A final course-level instructional strategy is the provision of opportunities for self-directed learning and problem solving to occur. Self-directed learners possess a set of skills which allow them to understand what it is they need to learn, seek peer feedback, collaborate, and brainstorm solutions (Hemlo-Silver, 2004). In the realm of adventure programs, instructors may present problem-based scenarios and challenges to create opportunities for self-directed learning. For example, instructors can pose a question, navigational problem, or technical obstacle which students are challenged to overcome (Drury, et al., 2005 and Martin et al., 2006). Subsequently, students access their own skill sets of problem solving and decision-making independent of the instructors to create success. It may be through this self-directed process that learning occurs. Using this approach, Sungur and Takkaya (2006) noted a positive effect on the development of

learning characteristics such as cooperation with others, reflecting on their own thinking, goal setting, and peer learning.

Lastly, the present study examined the specific characteristic of instructor experience as a possible predictor of outcomes. In a wilderness therapy context, Wichmann (1991) found instructor experience to be a significant predictor of post-course behavior. However, in the general education context, a meta-analysis by Hanushek (1986) examined 109 studies and found that less than half of the results indicated any significant relationship between instructor experience and student achievement. Further, of those whose findings indicated significance, the author found seven studies showing that experienced teachers actually had a negative effect on student achievement. The variance in the findings of these studies prompted the inclusion of instructor experience in the present study in order to further understand its role in an adventure-based context as a predictor of student outcomes. This study utilized weeks of NOLS-recognized field time as a proxy measure for experience.

Methods

Data were collected from NOLS students through the NOLS Outcome Instrument (NOI) (Sibthorp et al., 2005), which is based on the NOLS course objectives. Internally at NOLS, leadership, communication, and expedition behavior skills are all considered part of "leadership." We had previously explored this model (cf. Sibthorp et al., 2005) through a confirmatory factor analysis. Thus, for this study, we considered treating the leadership, communication, and expedition behavior items as content domains of a larger leadership construct, and judgment in the outdoors was combined with outdoor skills into a larger composite, as well. This new leadership composite variable consisted of 12 items (4 from each content domain) and exhibited acceptable internal consistency (alpha=.84). The outdoor skills composite consists of 5 items and was internally consistent (alpha=.82). Environmental awareness (4 items, alpha=.76) remained unchanged from previous version of the NOI. All outcomes were measured on an eight-point rating scale (ranging from 1 = "not like me" to 8 = "like me") using a retrospective pretest/posttest format (see Howard et al., 1979). After the NOI data were screened and cleaned, difference scores were calculated, which is appropriate when using a retrospective pretest.

As a portion of the extension aspect of this study, data were also collected from instructors and matched to the responses of students on those respective courses. In cases where multiple instructors combined to form teams, average scores were computed to indicate the value the team placed on a variety of instructional strategies. Further, each instructor provided demographic information and perceptions and observations regarding his or her course.

Data were then analyzed using hierarchical linear modeling (HLM), specifically HLM 6.0 software, to account for the nested structure of the data and to replicate the methods from the previous study. Initially, null (or empty) models were run to ensure a significant amount of variance in each outcome variable could be attributed to the course level (level 2). Significant predictor variables from the previous study (Sibthorp et al., 2007) were then added (level 1: age, sex, previous expedition experience, perceptions of empowerment; level 2: instructor rapport,

group functioning), followed by the new level 2 variables (the instructional strategies) hypothesized to be important to participant development.

In addition to these primary analyses, two additional analyses were run. These were run separately to allow more meaningful comparisons to be made within specific subsets of the overall sample. While course length was included in the original model, data were available during this iteration to more clearly examine the importance of duration. To assess the potential relationship between course duration and developmental outcomes, a MANOVA test was run where two similar courses that varied primarily in length were compared across the three targeted course outcomes (leadership, outdoor skills, and environmental awareness). The two courses both focused on youth ages 13-15, both occurred in the intermountain west, and focused on backpacking as the major activity type. The primary difference between the courses was length: "short" courses consisted of 14 days, and "long" courses lasted 30 days.

To examine the potential relationship between instructor seniority and participant outcomes, an additional set of multilevel models were tested, which included course leader and instructor team seniority (weeks of NOLS-recognized field experience). As with course duration, in order to make this comparison meaningful, the sample needed to be further constrained, as certain course types, by their inherent nature, attract more or less experienced staff teams. Wind River Wilderness courses were selected for this sample because they are the "classic" wilderness courses offered by NOLS and comprise a relatively large percentage of NOLS courses. For these models, course leaders' and instructor team's weeks of NOLS recognized field experience were examined as potential predictor variables.

Results

Data were collected from 1,696 participants on 155 NOLS courses between 2005 and 2006. In efforts to constrain the sample to be as representative as possible of the "typical" adventure program participant, 405 participants over the age of 21 during their courses were removed; 48 participants who were Naval Academy cadets participating in custom courses were removed; 36 who were enrolled in NOLS professional courses (guiding, outdoor educator, or instructor courses) were removed; and four courses which had only three participants who were 21 or younger were also deleted because of the instability of course-level estimates. These deletions left a usable sample of 1,228 participants on 113 NOLS courses. This remaining sample was 68% male, which is typical of NOLS courses, and had an average age of 17.8 years.

The initial null models all showed a significant amount of variance ($p < .05$) was attributable to level 2 (the course level), with ICCs that ranged from a low of .092 (9.2%) for leadership to a high of .168 (16.8%) for outdoor skills. The predictors were then added to each model.

Perceived gains in leadership were significantly predicted by previous expedition experience, sex, age, and empowerment at level 1 (the participant level). Higher gains were reported by participants without previous expedition experience ($t = -3.66$, $p < .01$), male participants ($t = -2.63$, $p < .01$), younger participants ($t = -3.44$, $p < .01$), and those who experienced greater empowerment on their courses ($t = 3.27$, $p < .01$). Of the potential course-level predictors, average rapport with instructor explained a significant amount of the variance (greater instructor

TABLE 1

Mean Scores on Targeted Outcomes by Course Length

	Leadership		Outdoor Skills		Environmental Awareness	
	Mean	Std. Error	Mean	Std. Error	Mean	Std. Error
Short (14 days)						
Pre	4.924	.097	4.188	.140	3.202	.132
Post	6.160	.075	6.486	.076	5.378	.118
Long (30 days)						
Pre	5.212	.099	4.367	.143	3.248	.134
Post	6.585	.076	7.034	.078	6.131	.121

Discussion and Implications

The purpose of this study was to expand on previous work with NOLS by investigating the effect of new predictor variables on student development. Results suggest several interesting relationships with respect to variables in the original model (Sibthorp, Paisley, & Gookin, 2007). First, participant sex is related to outcomes: Women report learning more outdoor skills and men report learning more leadership-oriented skills. This may make sense in that women, stereotypically, have higher levels of leadership-oriented/interpersonal skills than men; and men, also stereotypically, have higher levels of outdoor/technical skills than women. While it may be discouraging to reinforce stereotypes, the data do suggest that this pattern exists.

Second, evidenced by the t-values, previous experience has an impact on learning of both leadership-oriented skills and outdoor skills, but this impact is much larger with respect to outdoor skills. This difference may be due to the sheer novelty of the outdoor skills: Students without previous expedition experience have had little, if any, exposure to this type of activity. In contrast, most students have likely had some form of exposure to leadership-oriented skills, making them less likely to either perceive or report gains of the magnitude seen in outdoor skills.

Another interesting result involves the impact of "rapport with the instructor," which is significantly related to and more predictive of perceived gains in all three areas in the present study than in the original model. This may be due to rephrasing of the item from the student having a "close relationship" with an instructor to an instructor "showing a genuine interest in

me [the student] as a person." The modification of this item may have reduced social desirability among the students and, certainly, reduced confusion of its meaning.

With respect to extension, both coaching and opportunities for self-directed learning were identified as new and significant predictor variables. Coaching was positively related to students' perceived increases in outdoor skills, suggesting that consistent, one-on-one, tailored feedback is important to the development of complex technical abilities. These findings are consistent with the literature. Hodges and Franks (2002) explained that feedback provided by the instructor is critical to learning. Further, adventure programming text authors (i.e. Gilbertson et al., 2006) recommend coaching as an effective instructional strategy. The significance of coaching may also be attributed to the interpretation of this variable by instructors who may have included demonstration as part of their coaching repertoire and did not separate the two variables when responding on the survey instrument. Overall, coaching as a significant course-level predictor provides support for its inclusion as a viable technique for adventure programmers.

Opportunities for self-directed learning were positively related to increases in environmental awareness, supporting the notion that "the mountains can speak for themselves." Similarly, Sungur and Takkaya (2006) explain that providing opportunities for self-directed learning had a positive effect on the learning characteristic of students reflecting on their own thinking. It is interesting that this strategy was not significantly related to leadership or outdoor skills, but, perhaps, this is due to the affective nature of environmental awareness in comparison.

The remaining instructional strategies examined as an extension of the previous study include demonstration, role modeling, discussion, lecture, and skits and role plays; all of which were not significant predictors in the current model. Demonstration, as previously discussed, may have been problematic for respondents to distinguish from coaching. Role modeling is an abstract strategy, and it may have been difficult for instructors to quantify the amount of time spent role modeling a specific behavior. Discussion may have been subsumed, in the instructors' perceptions, by a number of other strategies, making its impact difficult to discern. It is not surprising that lecture was not a significant predictor, as it is often perceived as antithetical to the experiential learning process. Skits and role plays were not significant predictors of outcomes due, perhaps, to the lack of implementation of this technique across all courses.

Given the importance of course duration in previous studies (e.g., Hattie et al., 1997; Russell, 2003, Sibthorp et al., 2007) and the simple and likely impact of greater time or "dosage" in any educational setting, it is not surprising that course duration seems to play a role in student learning. It is interesting, though, that the primary differences in this study occurred in environmental awareness and outdoor skills rather than leadership. Thus, it is possible that course length or duration is more important to achieving some outcomes than to others.

Finally, instructor experience was not a predictor of outcomes in the tested model. These findings are congruent with the majority of the literature reviewed in a meta-analysis by Hanushek (1986). This finding may be discouraging, considering the assumption that more experienced staff should be better capable of "producing" higher gains in student development. In contrast, it may be that newer instructors are invigorated to try new approaches while longer-

term instructors become more complacent about curriculum delivery. This finding, in conjunction with the others, certainly warrants further investigation about the role of the instructor.

As with most field-based research, this study includes a number or limitations and caveats. First, as mentioned previously, this study was conducted with a convenience sample from NOLS. While other expeditionary adventure-based program may find some of the concepts and principles applicable, the NOLS model is certainly not representative of most adventure programs and targeted fairly specific outcomes.

Most of the data collected were self-reported perceptions, and may not be indicative of actual skill level or behavior. The measures of instructional strategies were especially challenging, as they sought to measure the perceived value of each strategy for an individual instructor in a general sense. Thus, they did not capture how often the strategy was actually employed on the given course (which had multiple instructors), nor did these measures capture instructional preferences and values which might be tied to very specific outcomes (e.g., demonstration specifically for teaching outdoor skills but not for leadership). We suspect these problems are at least partially responsible for the lack of explanatory power of the instructional strategies in the tested models.

Lastly, as with all correlational research, these models are simply predictive and are not causal. While it is tempting to draw causal inferences between the predictors and the outcomes, the actual ability of the significant predictors to directly impact outcomes remains speculative. Adventure programs remain highly complex and multifaceted, and there are likely a number of additional predictor variables and mediator and moderator variables that remain unexplored in this study.

Conclusion

In conclusion, there is strong support for the replication of the previous theory-outcome-program model for NOLS. The participant characteristics of previous experience, sex, age, and empowerment are predictive of student learning. At the course level, rapport with the instructor is consistently important. Also at the course level, duration seems to influence outcomes. With respect to the extension aspect of the study, the instructional strategies of coaching and providing opportunities for self-direct learning also appear to play a role in outcome achievement. Interestingly, instructor experience may not matter with respect to outcome achievement. With substantial variance in the model remaining unexplained, despite the inclusion of instructional strategies and instructor experience, these results beg the question of what else impacts student learning on-course? Future studies will examine additional dimensions of the instructors' roles and will seek to identify other predictors of NOLS outcomes.

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