

The Influence of Childhood: Operational Pathways to Adulthood Participation in Nature-Based Activities

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Abstract

A conceptual and operational model examined relationships among childhood participation in nature-based activities, motivations, constraints, mitigation of constraints, and adult visits to Minnesota State Parks. The results support a model in which (a) higher childhood participation in nature-based activities increased motivation and mitigation strategies, (b) constraints decreased state park visitation and also triggered the use of mitigation strategies that in turn increased state park visits, and (c) higher levels of motivation improved efforts to negotiate constraints and visit more. Consistent with the main hypothesis, the more nature-based activities people participate in during childhood, the more they desire such activities and are able to mitigate constraints to participation, and consequently, the higher the level of participation, as an adult. The results suggest a rather indirect association between childhood participation in nature-based activities and adulthood participation in such activities.

Keywords

childhood participation, nature-based activities, motivations, constraints mitigation

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Introduction

Exposure to nature has multiple benefits, including improved health and attentional capacity, and positive emotions (Kahn, Severson, & Ruckert, 2009; Kuo, 2001; Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009). Childhood nature interactions are known to support major developmental processes of adolescence (Lloyd, Burden, & Kiewa, 2008), improve social behavior and moral judgment (Palmberg & Kuru, 2000), and enhance proenvironmental attitudes (Farmer, Knapp, & Benton, 2007). Taylor, Kuo, and Sullivan (2002) showed that green spaces help inner-city children lead more effective and self-disciplined lives. The cognitive functioning of inner-city children have also been shown to increase with improved “greenness” of their homes (Wells, 2000). It is well established that exposure to nature has significant benefits to humans (Kuo, 2001).

The positive effects of childhood experiences with nature are not limited to youth. Childhood nature experiences are shown to positively influence some dimensions of adult environmental attitudes and proenvironmental behaviors (Chawla, 2009; Wells & Lekies, 2006). Lohr and Pearson-Mims (2005) found significant association of adult attitudes, actions toward natural entities such as trees, and nature-based practices like gardening with childhood nature experiences. Some studies have also linked childhood participation in nature-based activities with adult participation in those activities. In a study of adult visits to green places in Britain, Thompson, Aspinall, and Montarzino (2008) found a positive association between adult visits to wild lands and childhood visits to such places. Thus, childhood participation in nature-based activities has immediate and potential long-term implications; it is healthy, induces and/or fortifies proenvironmental attitudes and behaviors, and is suggested to nourish enduring participation in nature-based activities. Given these important benefits of participation in nature-based activities, it is worth exploring the operation of the childhood participation–adult participation process.

Although it is known that childhood participation in nature-based activities is positively associated with adult participation in such activities, the association is at best a co-relation, the particular nature of which remains unclear. Thompson et al. (2008) examined adult visits to green places, including reports of the frequency with which they visited such places during childhood. The study found a strong positive association between childhood visits to green places and adult visits to such places. But, adult participation is also influenced by other factors not accounted for in current studies examining childhood–adult participation relationships. The influence of childhood participation in nature-based activities on adult participation, with respect to the much broader

psychological and resource conditions informing adult participation in nature-based activities, is incompletely understood. In this study, we improve that understanding by examining, in tandem, additional factors and the pathways by which childhood participation influence adult participation in those activities. By means of an operational model, we show how childhood participation in nature-based activities interacts with motivations, constraints, and mitigation strategies to influence adult visits to Minnesota State Parks.

Operational Models of Participation

Based mostly on propositions from Crawford, Jackson, and Godbey (1991) and Jackson, Crawford, and Godbey (1993), participation in nature-based activities and other forms of recreation operates within the cognitive, behavioral, and resource arrangements of motivations, constraints, and constraints mitigation. Participation occurs because participants are motivated to participate, but they are also constrained and do employ some strategies and resources to mitigate constraints to participation. That is, childhood participation may indirectly influence adult participation by influencing participants' motivations, constraints, and mitigation strategies and resources. In this study, we examine and propose whether and how these influences occur.

Following Hubbard and Mannell's (2001) lead, some operational models of adult participation have been proposed (e.g., Loucks-Atkinson & Mannell, 2007; Son, Mowen, & Kerstetter, 2008). Hubbard and Mannell tested operational models based on competing hypotheses about how motivations, constraints, and mitigation strategies interact to influence participation in work-site physical recreation activities in a corporate employee setting. They verified the proposition that constraints have negative effects on participation. They also demonstrated that, for participants, constraints elicit the use of strategies and resources (e.g., seeking a coparticipant to alleviate "fear" constraints and taking courses to lessen skill constraints) to mitigate constraints on participation. Their model showed that the greater the motivation to participate, the greater efforts corporate employees make to mitigate their constraints to participation and the more they participate as a result.

Using similar operational models, Son, Mowen, et al. (2008) showed how motivations, constraints, and mitigation efforts interact to influence participation in physically active leisure of middle-aged to older adults in a metropolitan park. Their model had similar findings to that of Hubbard and Mannell's (2001) except that they did not find any significant relationship between constraints, and mitigation strategies and resources.

Jackson (2005) referred to these operational models of participation as one of the most innovative and fruitful directions in fostering understanding of participation. Since then, a more inclusive operational modeling approach to understanding participation is emerging. Loucks-Atkinson and Mannell (2007) showed that the efficacy with which people with fibromyalgia syndrome mitigate their constraints have significant positive influences on motivations to participate and efforts to mitigate constraints to participate in physically active leisure. In a statewide study, White (2008) illustrated how the efficacy with which residents of Arizona mitigate their constraints to outdoor recreation influenced their motivations, constraints, and mitigation efforts, which indirectly influenced participation.

In studying middle-aged to older adults' participation in physically active leisure in a metropolitan park setting, Son, Kerstetter, and Mowen (2008) found that gender had a significant independent influence on frequency of participation but not on constraints. They did not find any significant influence of age on constraints and frequency of participation. However, they found that age and gender had positive and negative effects, respectively, on overall participation, with women participating less than men. These models provide empirical evidence that participation is inadequately understood without sufficient attention to the cognitive, behavioral, and structural conditions shaping its occurrence. In addition, these models do not explore the role of childhood participation, if and how it interacts with other factors to influence adult participation. Thus, efforts to understand the role of childhood participation on adult participation in nature-based activities will benefit from due attention to motivations, constraints, and mitigation strategies and resources. In this study, we use an operational model to demonstrate how childhood participation interacts with motivations, constraints, and mitigation efforts and resources to influence adult participation in nature-based activities.

It is recommended that future research and theory focus on identifying additional factors and how they may influence participation (Loucks-Atkinson & Mannell, 2007). The need for such a more inclusive understanding of the childhood–adult participation nexus is essential given claims of declining participation, shifts in nature-based activity preferences, and competition from nonnature-based forms of recreation (Pergams & Zaradic, 2006; Pergams & Zaradic, 2008a, 2008b). A more inclusive understanding of the childhood–adult participation connection could be useful in efforts to adequately face impending nature-based participation challenges. We report on an empirical examination of how childhood participation in nature-based activities influences adult participation, amid other factors, within the Minnesota State Park system. In this system, managers make efforts to enhance participation by minimizing and/or mitigating constraints. For example, signs

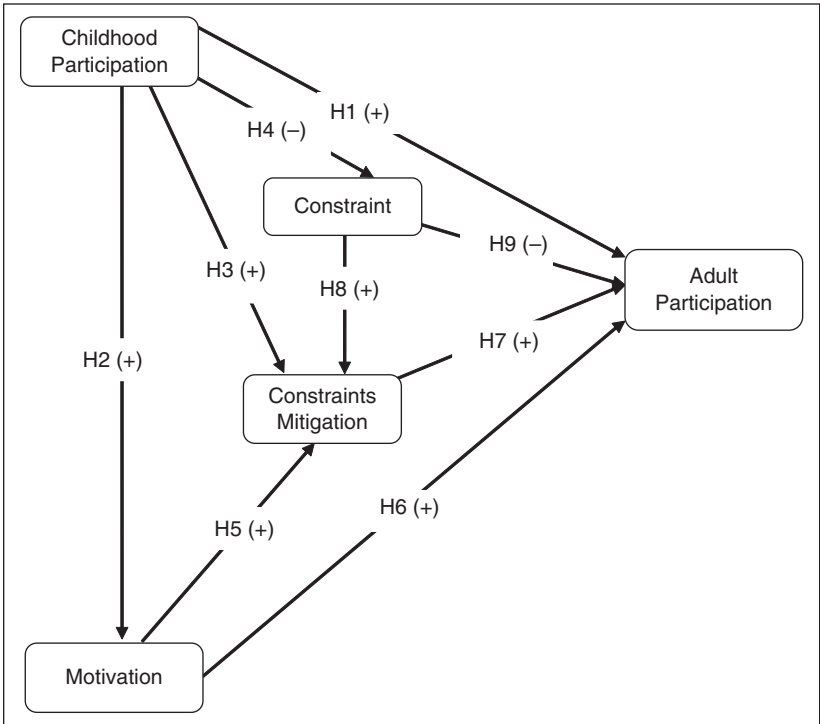


Figure 1. Hypothesized model for the role of childhood participation in nature-based activities on adult participation in nature-based recreation

are posted in areas where visitors are likely to get disoriented, thereby mitigating potential participants’ perceived fears of getting lost. Management also make frequent park ranger patrols to reduce perceived safety concerns. Efforts are also made to boost motivations to participate by communicating the benefits of participating in nature-based activities. Thus, understanding how childhood participation interacts with motivations and constraints mitigation might benefit management efforts to motivate participation and mitigate constraints to participation.

Objectives and Hypotheses

Figure 1 illustrates the conceptual model of the operation of childhood to adult participation in nature-based activities. Specifically, it investigates whether and how the influence of childhood participation in nature-based activities is

mediated by motivation, constraints, and mitigation strategies. We hypothesize that childhood participation interacts with motivations, constraints, and constraints mitigation, and ultimately influences adult participation as conceptually illustrated in Figure 1.

By testing the conceptual model, we contribute to a more elaborate portrayal of the relationship between childhood nature experiences and adult participation as advanced by Thompson et al. (2008). By so doing, we contribute to improving the understanding of the cognitive, behavioral, and resources conditions that inform the relationship between childhood participation and adult participation in nature-based activities. This enhanced understanding can assist efforts to motivate, facilitate mitigation, buffer constraints, and ultimately promote participation in nature-based activities and its resultant benefits to participants.

Method

Procedure

Data for this article were collected as part of an investigation of Minnesotan's favorite outdoor activities, support for park management changes, and participation in Minnesota State Park recreation (Asah & Kelly, 2008). The investigation was conducted in two phases. A total of 45 individuals, aged 20 to 40 years old, from the Minnesota general public participated in five focus-group interviews. Four of the focus groups were constituted by a mix of men and women, whereas one was constituted only of women with children who are highly involved in outdoor activities but have not visited a Minnesota State Park within 2 years prior to the interviews. The focus group interviews explored motivations, constraints, constraints mitigation, and participation (visits to, and length of time spent in, Minnesota State Parks). Focus group interview transcripts and notes were used to generate measures assessing childhood participation, adult participation, and initial sets of items measuring motivations, constraints, and negotiation strategies. These items were supplemented by items from other studies (Driver, 1977, 1983; Hubbard & Mannell, 2001; Kerstetter, Zinn, & Chen, 2002; Manfredi & Driver, 1996). Supplementary items were slightly rephrased to characterize the nature-based recreational settings of Minnesota State Parks.

A self-administered survey questionnaire was sent via mail to a random sample of 1,600 Minnesota households; 52 questionnaires were returned because of invalid addresses, leaving the effective sample at 1,548 households.

Following Dillman, Smyth, and Christian's (2009) recommendations and in 3-week intervals, a reminder postcard was sent, followed by another copy of the same questionnaire, to nonrespondents. Respondents returned completed surveys via mail in self-addressed envelopes provided with the questionnaire. The overall response rate was 50% ($n = 774$). We needed to have a measure of adult participation to test our models, so the 334 respondents who visited at least one Minnesota state park within 12 months prior to the survey were used for our model. Due to missing data, >50% on any given instrument, 23 of the 334 cases were excluded from model hypotheses testing.

Constructs and Measures

Childhood and adulthood participation. To assess childhood participation in or exposure to nature-based recreation, respondents indicated, on a list of common nature-based activities, all of those in which they participated during their childhood. To assess recent adulthood participation in nature-based activities, respondents were provided with a map of all state parks and were asked to indicate all parks that they had visited, and to indicate the number of days spent at each park, during the preceding 12 months. Respondents rated the statement "how important a part of your life is outdoor recreation" on a scale from 1 (*not important at all*) to 4 (*very important*). Respondents also estimated the number of days they had been outside for recreation over the 12 months preceding the study and checked all their most favorite outdoor activities on a provided list.

Motivations, constraints, and mitigation. To assess adult motivations, respondents rated the level of importance of each of the 30 motivation items framed as desired experiences (e.g., solitude, enjoy nature, socializing with friends and family, physical activity, introduce children to the outdoors, experience a sense of adventure, etc.). A Likert-type scale with a 5-point response format ranging from 1 (*not important*) to 5 (*very important*) was used. Similarly, adult constraints to participation were measured using a Likert-type scale of 30 items describing factors preventing them from visiting state parks at all or as often as they would like. Respondents were asked to rate, on a 5-point scale ranging from 1 (*not at all*) to 5 (*a great deal*), the extent to which their visits to state parks were constrained by factors such as lack of time, fear of getting lost in a park, having too many family obligations, having no one to go with, and not having enough money for park fees. The strategies and resources employed to mitigate constraints to participation, such as working long hours to make time for participation, using orientation devices to avoid getting

lost in the park, finding someone to recreate with, and setting aside money for park visits, were measured using frequency responses to a 27-item Likert-type scale with a range from 1 (*never*) to 5 (*very often*).

Data Analyses

Nature-based activities that respondents participated in during their childhood were grouped (summed) into two categories based on the criteria identified by focus-group participants. The first category labeled *low-entry activities* consisted of easy-to-learn activities and are relatively inexpensive activities. Low-entry activities included camping; fishing; canoeing; kayaking; hiking; backpacking; visiting state parks, national parks, and nature centers; swimming in a lake or river; and gathering mushrooms, berries, or other wild foods. High-entry activities, those considered to require higher skill level, risk, and/or finances, included hunting; snowmobiling; snow skiing; snowboarding; motorboating; and horseback riding. The mean scores of the two groups of activities constituting measures of childhood participation in nature-based activities were computed, as were the correlation coefficient and significance between these two categories of childhood exposure. Similar computations were made for the two measures of adult participation: the number of Minnesota State Parks visited and number of days spent in them within 12 months prior to the study.

Mitigation strategies and resources items were matched with congruent constraints items to ensure correspondence between constraints and mitigation. The primary interest was in the structural relationships among childhood participation, and adult motivations, constraints, constraints mitigation, and participation rather than in the dimensions of these constructs. To determine the dimensionality of motivations, constraints, and constraints mitigation, principal axis factoring (PAF), which minimizes measurement error within construct dimensions (Stewart, Barnes, Cote, Cudeck, & Malthouse, 2001), was conducted. Items with factor loadings ≤ 0.44 were eliminated. For the motivation scale, 29 items were retained; 19 and 24 items were retained for the constraints and constraints mitigation scales, respectively. The dimensions for each scale resulting from PAF were used to create item parcels for structural equation modeling (SEM). Hagtvet and Nasser's (2004) two-facet approach was used to construct domain-representative parcels for each construct. Equal numbers of items from each dimension of a construct were sequentially assigned to each of the two parcels. This procedure ensured that each parcel is equally representative of all dimensions of their respective constructs (Kishton & Widaman, 1994; Little, Cunningham, Shahar, &

Table 1. Descriptive Statistics for Childhood Participation, Adult Participation, and Adult Motivations, Constraints, and Constraints Mitigation Scales (*n* = 311)

Variables	<i>M</i>	<i>SD</i>	<i>R</i> (<i>p</i> value)
Childhood participation	6.40	3.06	.48 (<i>p</i> < .01)
Low-entry activities	4.43	2.11	
High-entry activities	1.97	1.42	
Adult participation	—	—	.32 (<i>p</i> < .01)
Number of parks visited in the last 12 months	2.36	1.57	
Number of days spent in parks in the last 12 months	7.79	15.07	
Main Scales			<i>α</i>
Motivation			.92
Constraint			.86
Constraints mitigation			.88

Widaman, 2002). Parcels serving as indicators of their respective constructs were then entered into SEM tests (Kim & Hagtvet, 2003). This approach allowed us to examine the relationships among constructs without compromising construct validity and latent variable measurement error (Bandalos & Finney, 2001; Sass & Smith, 2006).

The two categories of childhood activities served as indicators of childhood exposure to nature, whereas the number of Minnesota State Parks visited and days spent in state parks served as indicators of adult participation in nature-based activities. Reliability analysis (Cronbach’s *α*) of the motivation, constraints, and constraints mitigation scales were computed (Table 1).

The Preprocessor for Linear Structural Relations (LISREL) software (PRELIS Version 2) was used for data preparation (Jöreskog & Sörbom, 2002). The hypothesized model was tested using LISREL 8.8 (du Toit & du Toit, 2001; Jöreskog & Sörbom, 2006). Data were incomplete and deemed missing at random (Allison, 2003; Schafer & Graham, 2002), showing mild departures from normality, with absolute univariate skewness and kurtosis values slightly different from zero (Enders, 2001). Consequently, an expectation-maximization (EM) covariance matrix was estimated and maximum likelihood (ML) used to estimate model parameters and standard errors (Enders & Peugh, 2004). Following Enders and Peugh’s (2004) protocol, a minimum *N* per variance term of 253 was used as sample size because not all indicators

had missing values. Although ML assumes multivariate normality, it is robust for mild to moderate departures from normal distributions (Nevitt & Hancock, 2001). The EM–ML approach, and use of the minimum N per variance term, ensured that we accounted for missing data and mild nonnormality (Gold & Bentler, 2000).

Model fit was assessed using the standardized root mean square residual (SRMR), chi-square to degree of freedom ratio (χ^2/df), incremental fit index (IFI), relative fit index (RFI), root mean square error of approximation (RMSEA), and Tucker-Lewis index (TLI). Statistical significance of path coefficients was determined using LISREL's default t -values (tv); for our models and corresponding alpha values of $\leq .05$, t -values ≥ 1.81 are significant (Pearson & Hartley, 1966) with higher tv corresponding to greater statistical significance.

To further understand the application of our model to adult participation, we conducted a series of t -test comparisons of participants to nonparticipants. The aggregate measures of motivation, constraints, and mitigation strategies were compared with those of nonparticipants. We compared also participants and nonparticipants' ratings of the importance of outdoor recreation as a part of their lives, the number of days spent outside for recreation in the 12 months prior to the study, and the number of favorite outdoor activities.

Results

Childhood Participation, and Adult Motivation, Constraints, Constraints Mitigation, and Participation

The means, standard deviations, correlation coefficients, and associated p values between the constituent categories measuring childhood participation and items measuring adult visitation of Minnesota State Parks are shown in Table 1. Table 1 also shows the reliabilities of the motivation, constraints, and constraints mitigation main scales. During the 12 months prior to the study, respondents visited an average of more than two parks, spending an average of more than 7 days in Minnesota State Parks.

Table 2 shows a descriptive comparison of participants and nonparticipants. On average, outdoor recreation was more important a part of participants lives than for nonparticipants. In the 12 months prior to the study, participants were out for recreation on more days than nonparticipants. Participants were more motivated to participate, had more favorite outdoor activities, and participated in more nature-based activities during their childhood than nonparticipants. Nonparticipants perceived more constraints to participation but

Table 2. Descriptive Statistics Comparing Adult Participants and Nonparticipants

Variables	Participants			Nonparticipants			Significance (two-tailed)
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	
Importance of outdoor recreation to your life	3.64	0.59	330	3.19	0.90	333	.00
Days spent outside for recreation over past 12 months	6.63	1.41	329	5.91	1.97	338	.00
Most favorite outdoor activities	9.74	4.53	334	6.74	4.17	333	.00
Childhood nature-based activities	6.46	3.06	333	4.98	2.77	340	.00
Motivations to participate	3.18	0.51	326	2.94	0.82	318	.00
Constraints to participation	1.88	0.60	314	2.11	0.72	308	.00
Mitigation of constraints to participation	2.76	0.62	324	2.23	0.79	299	.00

employed less strategies and resources to mitigate those constraints than participants.

Operational Models of the Childhood and Adult Participation Process

An exploratory approach was adopted in hypothesis testing. First, a model with all hypothesized relationships, as shown in Figure 1, was tested. Non-significant paths were removed and the final model, nested within the initial model with only statistically significant paths, was assessed for absolute, relative, and overall fit. The fit indices for the initial and final models are shown in Table 3, and the standardized structural coefficients (SC), *tv*, *SE*, and variance explained (*R*² values) are shown in Table 4.

Initial model. Three of the nine hypothesized relationships in our conceptual model could not be verified. The structural paths from childhood participation, to constraints ($\gamma = 0.00$, *t*-value = 0.07), and to state park visitation in later life ($\gamma = 0.14$, *t*-value = 1.49) were insignificant. In addition, the path from childhood participation to constraint was positive and thus inconsistent with our hypothesis. Similarly, the structural path coefficient from motivation to participation ($\beta = .02$, *t*-value = 0.26) was statistically insignificant but

Table 3. Fit Indices for Initial and Final Models

Hypothesis	SRMR	χ^2/df	IFI	RFI	RMSEA	TLI
Initial model	0.030	1.372	0.99	0.93	0.038	0.98
Final model	0.029	1.292	0.99	0.94	0.034	0.98

Note: SRMR = standardized root mean square residual; IFI = incremental fit index; RFI = relative fit index; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index.

Table 4. Standardized Structural Coefficients, *t*-Values, Standard Errors, and Variance Explained for Initial and Final Models

Structural relationship	Initial model			Final model		
	SC (tv)	SE	R^2	SC (tv)	SE	R^2
Path to adult participation from			.27			.25
Childhood participation	.14 (1.49)	.09		—	—	
Motivation	.02 (0.26)	.09		—	—	
Constraints	-.37 (-3.01)	.12		-.38 (-2.91)	.13	
Mitigation	.37 (2.84)	.13		.42 (3.11)	.13	
Path to mitigation from			.27			.29
Childhood participation	.20 (2.84)	.07		.24 (3.31)	.07	
Motivation	.40 (6.08)	.07		.39 (5.91)	.07	
Constraints	.22 (3.39)	.06		.22 (3.44)	.06	
Path to motivations from			.01			.02
Childhood participation	.11 (1.62)	.07		.14 (1.88)	.08	
Path to constraints from			.00			
Childhood participation	.00 (0.07)	.07				

Note: SC = structural coefficients; tv = *t*-values; SE = standard errors.

consistent with our hypothesis. All other hypothesized relationships between constructs were statistically significant and consistent with our hypotheses. The model explained considerable amounts of variance in visiting and spending time in state parks ($R^2 = .27$) and constraints mitigation ($R^2 = .27$), and little or no variance in motivation ($R^2 = .01$) and constraints ($R^2 = .00$), respectively. The absolute fit (SRMR = 0.030, RMSEA = 0.038, $\chi^2/df = 1.37$) and relative fit (IFI = 0.99, TLI = 0.98) of the model were very good.

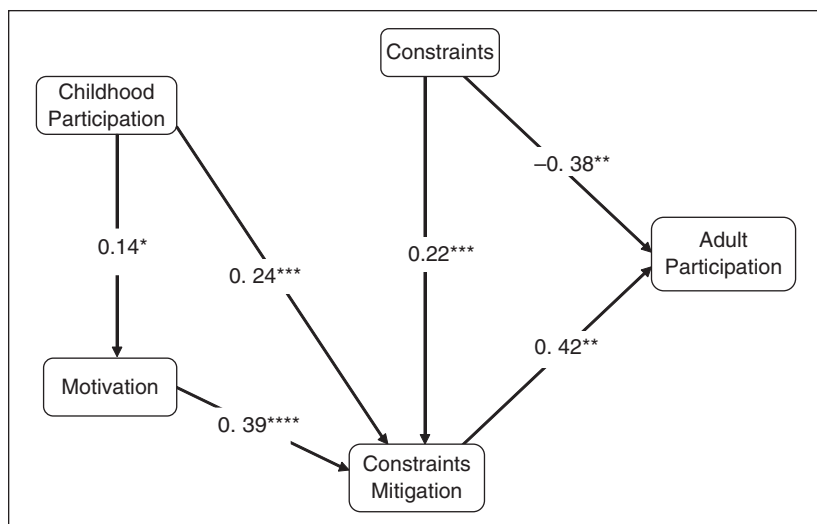


Figure 2. Final model showing pathways by which childhood participation influences adult participation in nature-based recreation

* $p < .05$. ** $p < .01$. *** $p < .005$. **** $p < .0005$.

Final model. In subsequent model testing, nonsignificant paths with the least t -value were progressively removed, one at a time, and the model retested until all paths were significant. All paths in the final model, shown in Figure 2, were statistically significant ($t \geq 1.81$) and consistent with our hypotheses. The model explained considerable amounts of variance in state adult participation ($R^2 = .25$) and mitigation strategies ($R^2 = .29$), and minimal variance in motivation ($R^2 = .02$). The absolute fit (SRMR = 0.029, RMSEA = 0.034, $\chi^2/df = 1.29$) of the final model improved. The overall fit (IFI = 0.99, TLI = 0.98) stayed about the same whereas the relative fit (RFI) of the final model was slightly improved from 0.93 to 0.94.

Thus, bearing in mind model fit, the statistical significance of hypothesized path coefficients, and comparisons of the initial and subsequent nested models, the final model that was best supported suggests that (a) childhood participation in nature-based activities positively influence adult motivations and the mitigation of constraints to visit Minnesota State Parks, (b) constraints negatively influence adult participation and positively influence use of mitigation strategies, (c) use of mitigation strategies and resources positively influence adult participation, and (d) motivation induces increased use

of mitigation strategies. Childhood participation in nature-based activities did not have a direct significant influence on adult participation or on adult-perceived constraints to visit and spend time in Minnesota State Parks. Similarly, motivations did not have a significant direct influence on adult participation. Thus, consistent with the main hypothesis, the more childhood exposure to nature (a) the more a person desires nature-based experiences as an adult and (b) the more resources and strategies they employ to overcome constraints to participation in such activities as an adult. Also, consistent with Hubbard and Mannell's (2001) findings, (a) constraints decreased state park visitation but also trigger the use of mitigation strategies that in turn increased state park visits and (b) the higher the levels of motivation, the more effort is expended to mitigate constraints and visit Minnesota State Parks.

Discussion

We suggest further support for the operation of participation in nature-based activities, including the proposal that participant encounters with constraints activate two opposing forces, one directly inhibiting participation and the other triggering mitigation efforts. These findings are consistent with those of Hubbard and Mannell (2001), Loucks-Atkinson and Mannell (2007), and White (2008). As illustrated in the final model (Figure 2), the positive effects of constraints mitigation efforts on participation were slightly greater (0.42) than the negative effects of constraints (-0.38) on participation. This suggests that the negative effects of constraints on participation are completely annulled by the positive effects of constraints on mitigation strategies.

However, the positive effect of constraints on mitigation strategies appears to be true only for participants; comparisons show that nonparticipants perceived more constraints to participation yet employed less effort to mitigate those constraints and eventually not participating. The comparisons also revealed that participants participated in more activities during their childhoods and were more motivated as adults than nonparticipants. These findings propose that the positive influence of constraints on participation is only true for participants who participated in more nature-based activities during their childhood and are more motivated. This proposition is novel; previous operational models of participation did not examine the relative magnitudes of constraints and mitigation strategies between participants and nonparticipants, and the possible implications for nonparticipation. The apparent counterintuitive approach to explaining participation by studying nonparticipants

should explain why nonparticipation has not been part of these studies. However, our findings suggest that studying nonparticipation might be just as insightful to understanding participation.

Our results also suggest further support of the role of motivation in the participation process. Consistent with Hubbard and Mannell (2001), Son, Kerstetter, et al. (2008), and White (2008), we found evidence suggesting that motivation to visit Minnesota State Parks influenced participation via its positive direct effect on mitigation efforts. However, unlike Loucks-Atkinson and Mannell (2007) and White, but consistent with Hubbard and Mannell and Son, Kerstetter, et al. (2008), we did not find any indications that the influence of motivation on participation is direct and independent of mitigation. That is, we confirm Hubbard and Mannell's claim that wanting or needing to participate does not mean that people, in fact, do participate. They first have to mitigate their constraints to participate.

Influence of Childhood Participation

Studies of the operation of the participation process offer important insights into people's recreational preferences and behaviors. Recent research situates participation in a broader context, examining the relationships between motivation, constraints, constraints mitigation, and participation (Hubbard & Mannell, 2001; Son, Kerstetter, et al., 2008). Jackson (2005) advocated for modifications, extensions, and alternative explanations of participation. There is growing evidence that other factors (e.g., self-efficacy, age, and gender) provide additional insights into our understanding of participation in nature-based recreation and other forms of leisure (Loucks-Atkinson & Mannell, 2007; Son, Mowen, et al., 2008; White, 2008). This study contributes to that evolution by exploring the role that childhood participation in nature-based activities play in adult visits to Minnesota State Parks. We found evidence of the influence of the process labeled *childhood participation*, defined as the number of nature-based activities people participated in during their childhood, on the operation of adulthood participation in nature-based activities.

Childhood participation had direct and positive effects on motivations and mitigation efforts. The more nature-based activities participants participated in during their childhood, the more they desire participating in such activities during adulthood. Similarly, the more nature-based activities individuals participated in during childhood, the more they employ strategies and resources to mitigate their constraints to participation as adults. Thus, childhood

participation in nature-based activities does not eliminate the existence and/or perception of constraints, a reason for the absence of a significant direct path between childhood participation and adult participation. However, childhood participation reinforces adult motivations to participate as well as adult efforts to overcome constraints and thus increase participation. This article enhances our understanding of Thompson et al.'s (2008) suggested association between childhood participation and adult participation in nature-based activities. It suggests operational pathways through which childhood participation interacts with motivations, constraints, and mitigation strategies to influence adult participation in nature-based activities. Most importantly, it further confirms suggestions that childhood participation in nature-based activities is an important antecedent to later life participation in such activities.

Childhood participation in nature-based activities is learned behavior, occurring within defined social arrangements and material conditions of immediate communities and society. Thus, childhood participation in nature-based activities is cultural (Salzman, 2001) and could be seen as the beginning of a nature-acculturation process with enduring implications for their nature-based activity preferences and behaviors as well as environmental attitudes and behaviors (Chawla, 2009; Thompson et al., 2008). But the social arrangements and material conditions under which childhood participation occurs are varied and complex. For example, participating in nature-based activities, as a child, might involve camping most frequently in a tent or a camper cabin, or staying at a nearby hotel. Childhood participation could also be with friends, family, and school and after-school programs. These varied social arrangements and material conditions might have distinct implications on the childhood-adulthood participation nexus. Our measures of childhood exposure did not attempt to capture that variety and complexity and thus do not address their potential influences on adult participation. Future studies focusing on the social arrangements and material conditions under which childhood participation in nature-based activities occurs could offer further insights into the operation of adult participation in such activities. However, our findings further demonstrate the complexity of the participation process, extending beyond social psychological and structural factors to include the learned behavior of introducing and nurturing childhood participation in nature-based activities. That is, adult participation in nature-based activities is subject to the interactive influences of motivations, constraints, and mitigation strategies as well as childhood nature-based experiences.

Conclusion

Our findings should be interpreted with some caution; adult participation was measured within 12 months prior to the study. It is possible that we excluded respondents who participated in nature-based activities as children but could not visit state parks during the year preceding the study. In addition, our measures of childhood participation were retrospective self-reports. Adults who are more involved in nature-based activities are likely to more vividly recollect and report their childhood nature experiences than those who are not currently engaged in such activities. Valid measures of childhood participation are obtainable via longitudinal studies that record and follow childhood participation through to adulthood. Such relatively more expensive studies will take decades. Similarly, measures of childhood participation in nature-based activities could be validated via interviews with parents, teachers, scout leaders, and so on, but we did not find such an approach reliably feasible. Thus, our reliance on participants' retrospective self-reports and its inherent limitations. This study is limited to state park visitation and may not apply to other forms of participation in nature-based activities. Future studies exploring these limitations would significantly improve our understanding of the influence of childhood participation on adult participation. Bearing in mind these limitations, the model suggests an enhanced understanding of the psychological and resource conditions under which childhood participation in nature-based activities informs adult participation in such activities.

Studies have empirically verified the assertion that participation in nature-based recreation and other forms of leisure operate within the framework of motivations, constraints, and mitigation strategies (Hubbard & Mannell, 2001; Loucks-Atkinson & Mannell, 2007; Son, Kerstetter, et al., 2008; Son, Mowen, et al., 2008; White, 2008). Concurrently, studies have associated childhood participation with adulthood participation (Lohr & Pearson-Mims, 2005; Thompson et al., 2008). However, very few studies have further explored and expanded on the nature of that association. By embracing the concept that participation operates within the confines of motivations, constraints, and constraints mitigation, our study identifies operational pathways through which childhood participation influences adult participation. The hypothesized direct relationship between childhood participation and adult participation was not significant. Instead, we found that the effect of childhood participation in nature-based activities on adult participation is mediated by motivation and mitigation strategies employed to overcome constraints to

participation. That is, childhood participation increases adulthood desires for nature-based activities (motivations) as well as efforts to mitigate constraints to participation. Thus, as adults, childhood-nature participants do not cease to perceive constraints to participation; they are more willing and able to mitigate constraints and thus increase participation.

Most importantly, for nature-based recreation management, providing recreational opportunities for children and families with children has enduring implications on later life participation in nature-based activities. It is likely that children who participate in nature-based activities will continue to do so as adults because they will desire nature-based experiences more and will be more able and willing to employ mitigation strategies to achieve such experiences. Thus, besides the obvious social-psychological and physical health benefits, enduring participation can be encouraged by targeting children in the provision of nature-based recreational services. It should not just be the matter of adults taking the kids to the woods; it could also be about the kids making adults to take them to the woods.

Nature-based recreation is currently challenged at multiple fronts. It faces competition from other forms of entertainment, particularly electronic technology (Pergams & Zaradic, 2006; Staempfli 2009), and other preoccupational demands like school and work. There are nascent claims of a pervasive decline, or at best a fundamental shift, in nature-based recreation participation and preferences across the developed world (Pergams & Zaradic, 2008a, 2008b). Adequately facing these challenges will require continued development of the conceptualization, empirical verification, and ultimate understanding of enduring participation in nature-based activities. For example, in response to the decline and/or shift in state parks visitation, managers make efforts to enhance participation by boosting motivations and minimizing and/or mitigating constraints. Examples of such efforts include posting signs in areas where visitors are likely to get disoriented to mitigate participants' perceived fears of getting lost, making frequent patrols to reduce perceived safety concerns, and communicating the benefits of participating in nature-based activities to motivate participation. As shown in our model, childhood participation performs similar functions as these management interventions; encouraging childhood participation might be an alternative way to boost motivations, enhance mitigation strategies, and consequently seed enduring participation. Thus, enhancing childhood participation in these settings may have other benefits such as reduced resources employed to motivate participation and mitigate constraints to participation.

Appendix

Descriptive Statistics for Scales and Items Used to Measure Motivations, Constraints, and Constraints Mitigation for Participants

Descriptive Statistics for Motivations Scale and Items

Item	<i>n</i>	<i>M</i>	<i>SD</i>
To rest mentally	321	4.34	1.04
To enjoy smells and sounds of nature	321	4.56	0.86
To experience solitude	321	4.26	1.10
To explore and discover new things	307	4.21	1.08
To enjoy different experiences from home	314	4.13	1.16
To rest physically	322	3.60	1.43
To feel exhilarated	314	3.84	1.26
To spend time with family	319	4.36	1.11
To get away from life's usual demands	316	4.47	1.04
To get/keep physically fit	317	3.85	1.27
To feel more self-confident	319	3.02	1.55
To experience silence and quiet	318	4.10	1.21
To enjoy natural scenery	321	4.70	0.67
To get away from crowds	317	4.40	1.10
To feel healthier	318	4.03	1.22
To get a chance to test my equipment	319	2.57	1.48
To experience peace and calm	317	4.14	1.19
To help family, friends, or others develop their outdoor skills	318	3.20	1.43
To experience spiritual renewal	317	3.00	1.58
To learn more about nature	320	3.85	1.23
To spend time with friends	319	3.87	1.29
To experience a sense of history	315	3.65	1.30
To introduce children to the outdoors	319	4.03	1.34
To experience a sense of adventure	313	3.85	1.28
To take some risks	318	2.91	1.51
To try new things	319	3.61	1.32
To have fun	320	4.61	0.84
To enjoy fall colors	319	4.43	0.94
To reflect on past memories	320	3.60	1.41

Descriptive Statistics for Constraints Scale and Items

Item	<i>n</i>	<i>M</i>	<i>SD</i>
I have too many family obligations	296	2.99	1.24
The parks are too far from home	293	2.20	1.13
I do not have enough money	298	2.33	1.26
The parks are too crowded	291	2.27	1.09
I am afraid of getting lost in the park	291	1.26	0.72
I have no one to go with	288	1.54	1.00
I fear crime/harm from other people	292	1.35	0.75
I am afraid of getting hurt	291	1.25	0.65
I do not have enough time	303	3.13	1.33
I do not have the right skills for most outdoor activities	293	1.51	0.91
My friends/family skill levels are different from mine	274	1.64	0.94
I am afraid of getting sick	296	1.34	0.74
I do not have the right equipment	290	1.49	0.85
I have health problems	292	1.46	0.98
My friends/family prefer other activities	283	1.92	1.06
I dislike bugs	288	1.91	1.06
It is difficult to coordinate schedules with family/friends	288	2.48	1.17
Visiting the park requires too much planning	296	1.60	0.88
I am scared of wild animals	294	1.26	0.68

Descriptive Statistics for Constraints Mitigation Scale and Items

Item	<i>n</i>	<i>M</i>	<i>SD</i>
I try to make outdoor recreation a priority	312	3.43	1.04
I get up earlier or stay up late to have more time to visit the parks	305	2.66	1.01
I try to plan ahead for the park visits	308	3.20	1.09
I take more short trips to the parks	305	3.02	1.05
I cut short other activities to make more time for park visits	305	2.31	0.84
I push myself harder to get out and do something	311	2.84	0.92
I try to improve my outdoor skills	309	2.45	1.09
I go with friends/family who help me learn new outdoor skills	305	2.31	1.02
I take lessons/classes to learn outdoor skills	309	1.79	0.92
I find people to recreate with	308	2.78	1.22
I find people with similar interests	308	2.93	1.16
I go alone if I do not have someone to go with	310	2.27	1.27
I choose activities that all of us can participate in as a family	302	3.44	1.14

(continued)

Appendix (continued)

Item	<i>n</i>	<i>M</i>	<i>SD</i>
I set aside or budget money for park visits	310	2.13	1.25
I improvise with equipment I have	306	2.83	1.27
I borrow/rent equipment instead of buying it	305	1.91	1.08
I participate in activities that are inexpensive or free	310	3.24	1.21
I share rides with others	308	2.28	1.23
I take steps to be safe	313	2.28	1.25
I use orientation devices	313	2.55	1.30
I use bug spray	317	3.75	1.08
I wear appropriate clothing	319	4.16	0.90
I recreate at times when parks are less busy	305	3.14	1.19
I go to different parks	293	2.44	1.17

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