Leisure Sciences

Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713773100

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Online publication date: 17 December 2009

To cite this Article Freudenberg, Philipp and Arlinghaus, Robert(2010) 'Benefits and Constraints of Outdoor Recreation for People with Physical Disabilities: Inferences from Recreational Fishing', Leisure Sciences, 32: 1, 55 — 71
To link to this Article: DOI: 10.1080/01490400903430889
URL: http://dx.doi.org/10.1080/01490400903430889

Leisure Sciences, 32: 55–71, 2010

ISSN: 0149-0400 print / 1521-0588 online
DOI: 10.1080/01490400903430889

Routledge
Taylor & Francis Group

Benefits and Constraints of Outdoor Recreation for People with Physical Disabilities: Inferences from Recreational Fishing

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The benefits and constraints to angling participation experienced by recreational anglers with and without disabilities were compared in this study. Data were gathered for 775 angler organization members ($n = 347$ with disabilities) responding to a mail survey in Germany. Anglers with disabilities were older and more often retired than anglers without disabilities, but there were no differences in angling frequency between angler groups. The social and self-improvement benefits associated with recreational fishing were higher for anglers with disabilities compared to anglers without disabilities, and anglers with disabilities experienced significantly more and different constraints to participation. Targeted management actions specifically directed at people with disabilities are needed to capitalize on the importance of a nature-based recreation activity like angling for this demographic group.

Keywords angling, catch, clubs, human dimensions, inclusive leisure, motivations

One demographic segment that has not received much academic attention from nature-based outdoor recreation researchers is that of people with physical disabilities (Williams

We thank the staff and the leaders of the German Anglers Association and the Institute of Inland Fisheries, particularly Dr. Uwe Brämick, Michael Winkel, and Bernd Mikulin, for support. We also thank all anglers providing feedback on earlier questionnaire versions. Reviewers and Karla Henderson provided valuable feedback, and Ben Beardmore assisted with editing. Funding was provided by the German Anglers Association and by the Leibniz-Institute of Freshwater Ecology and Inland Fisheries within the Adaptfish project (www.adaptfish.igb-berlin.de) funded by the Gottfried-Wilhelm-Leibniz-Community to RA.

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et al., 2004). This group differs substantially from people without disabilities in the type of outdoor experiences sought (Williams et al., 2004), the psychological benefits of the activity (McAvoy, 2001), and the level and type of constraints experienced (Anderson et al., 1997; Burns & Graefe, 2007; McAvoy et al., 2006). No comprehensive quantitative study on the benefits and constraints experienced by people with disabilities exists for recreational fishing. The aim of this article is to compare the benefits of and constraints to nature-based outdoor recreation for people with and without physical disabilities that participate in recreational fishing in Germany.

People participate in outdoor recreation because the activity provides social, psychological, and physiological benefits (Manfredo, Driver, & Tarrant, 1996; Manning, 1999). Expectancy theory suggests that people engage in a particular activity because they are motivated to reach personal goals (Driver & Cooksey, 1977; Driver & Knopf, 1976; Knopf, Driver, & Bassett, 1973). Early motivation research by Driver and colleagues (e.g., Driver & Cooksey, 1977) along with many subsequent studies (e.g., Arlinghaus & Mehner, 2004; Fedler & Ditton, 1994; Moeller & Engelken, 1972; Ross & Loomis, 2001) documented that recreational angling constitutes a multifaceted outdoor recreation activity in which anglers strive to satisfy an array of activity-general (i.e., common to all outdoor recreation activities, such as a nature experience) and activity-specific motives (i.e., unique to recreational fishing, such as catching a trophy fish; Arlinghaus, 2006; Fedler & Ditton, 1994; Fisher, 1997). However, motivations are not equivalent to benefits received because the flow of benefits depends on the quality of the experience relative to the recreationist's expectations (Arlinghaus, 2006; Manning, 1999). Understanding the benefits experienced by recreationists is particularly relevant to study in the context of people with disabilities because these people tend to be confronted with constraints that may prevent them from realizing the full suite of desired psychological outcomes (Burns & Graefe, 2007).

Researchers have shown that people with disabilities benefit substantially from outdoor leisure activities (e.g., Blinde & McClung, 1997; Loy, Dattilo, & Kleiber, 2003; McAvoy et al., 2006; McAvoy et al., 1989). In comparative studies, the recreationists' feelings of achievement and personal growth as well as enhanced relations to others were found to be more pronounced in people with disabilities compared to people without physical disabilities (Anderson et al., 1997; McAvoy et al., 2006). Based on these findings, the first hypothesis tested in this article is that anglers with disabilities derive larger benefits for self-improvement and health enhancement as well as greater social benefits from outdoor recreation compared to people without disabilities.

In addition to benefits experienced, another major social-psychological theme of importance in the context of our article is constraints to participation. Crawford and Godbey (1987) distinguished three classes of constraints experienced by outdoor recreationists that may constrain the initiation or frequency of participation in a given leisure activity: intrapersonal, interpersonal, and structural constraints. Intrapersonal constraints involve the individual's internal psychological processes that affect preferences toward activities (e.g., perception that a particular activity such as fishing is inappropriate because living beings are harmed). Interpersonal constraints result from interactions with other individuals (e.g., not having an appropriate social group). Structural constraints are factors that directly interfere with participation (e.g., lack of time and money). Engaging in a given recreational activity indicates that basic constraints that prevent initiation of a particular leisure activity have been overcome or effectively negotiated (Crawford & Godbey, 1987; Crawford, Jackson, & Godbey, 1991; Iso-Ahola & Mannell, 1985; Jackson, Crawford, & Godbey, 1993). However, participation does not mean that the recreationist is no longer constrained (Jackson et al., 1993).

Previous research on leisure constraints has identified factors that limit an individual's ability to participate in outdoor recreation (Crawford et al., 1991; Jackson, 1988; Jackson et al., 1993). However, only a handful of studies on constraints have dealt with recreational

fishing. These fishing studies showed that structural constraints were the most important factors inhibiting or reducing participation in recreational fishing (Aas, 1995; Fedler & Ditton, 2000, 2001; Ritter, Ditton, & Riechers, 1992; Sutton, 2007). However, interpersonal constraints and some intrapersonal constraints have also been found to affect fishing participation (Ritter et al., 1992; Fedler & Ditton, 2001). The most prevalent constraints experienced by anglers with disabilities can be expected to be related to health issues (Aas, 1995; Burns & Graefe, 2007; Jackson, 1988), the associated constrained mobility (McCormick, 2001; Williams et al., 2004), insufficient or inappropriate support by others before or during the fishing trip (Burns & Graefe, 2007), or social stigma-related interpersonal barriers (Bedini, 2000; West, 1984). In our study we test a second hypothesis regarding whether anglers with disabilities experience more and different constraints compared to anglers lacking a disability. We expected the most important constraints experienced by people with disabilities would be health and mobility related.

Methods

Study Area

Data were gathered for anglers who were members in the German Anglers Association (DAV) residing in four states (Berlin, Brandenburg, Saxony, and Saxony-Anhalt) in eastern Germany. The DAV is the largest angler organization in eastern Germany, and its federations manage hundreds of freshwater fisheries. Approximately 7–9% of the total population in the study area exhibit a severe disability (Statistisches Bundesamt, 2007). The percentage of anglers with severe disabilities in the total angler population is unknown as is their fraction in the DAV.

Angler Sample Selection

We created a paired sample by drawing similar sample sizes of anglers with and without disabilities from the same angling clubs governed by the DAV. This approach controlled for a potential angling-club effect on the benefits and constraints experienced. Although our sampling approach allowed comparing people with and without disability, it did not allow unbiased population estimates. To collate an address list of anglers, the managers of individual angling clubs ($n = 803$) with at least 50 members were contacted by mail and asked to report all known anglers with some form of a physical disability and a specified number of anglers who had no disability. To this end, rules were prescribed following principles of systematic random sampling. Nonrespondents received a reminder letter three weeks after the initial mailing. We corrected the final address list available for sampling for duplicates and nondeliverables. Ultimately, 1,518 suitable addresses for 775 anglers with some form of physical disability, and 743 anglers without disabilities were available.

These anglers received a mail survey with procedures that followed a modified total design method as described by Salant and Dillman (1994). In August 2007, the questionnaires were mailed along with a personalized cover letter in first class mailings along with a stamped self-addressed return envelope. Nonrespondents were mailed a reminder postcard four weeks later. A final reminder mailing with a new cover letter, a new questionnaire set, and a new free return-envelope was sent after three more weeks had passed.

Questionnaire Content

A ten-page self-administered questionnaire was designed to measure key human dimensions. Prior to designing the final questionnaire, we consulted with selected anglers with disabilities to better understand the characteristics of this group. We also pretested drafts

of the questionnaire with anglers who had differing physical disabilities. To meet ethical criteria, drafts of the questionnaire were evaluated by governmental representatives overseeing the interests of people with disabilities.

The final questionnaire assessed demographics, fishing behavior, fishing preferences, and benefits and constraints experienced. Benefits experienced were assessed using 27 items with a 5-point Likert-type agreement answer scale ranging from 1 = strongly disagree to 5 = strongly agree. The items reflected single benefit components potentially realized with theorized individual items to measure latent subdimensions (e.g., social interaction benefits or nature and relaxation-related benefits) that we call benefit domains. Published items measuring the most salient catch and noncatch related fishing motivations (Fedler & Ditton, 1994; Manfredo et al., 1996) were used. These items were supplemented by additional items self-generated from studies on people with disabilities covering social-integrative benefits such as social adjustment (Anderson et al., 1997; McAvoy et al., 1989), mutual support and acceptance (Blinde & McClung, 1997; Loy et al., 2003), personal growth (McAvoy et al., 1989), and training of mental and physical abilities (McAvoy et al., 2006). All items were discussed during pretests with anglers with disabilities to ensure completeness.

We identified and measured the number and type of constraints experienced by respondents following Sutton's (2007) approach. Respondents that indicated they had fished less than desired during the 2006 fishing season at their main fishery or were unsure were presented with a list of 28 possible reasons for reduced fishing activity with the same 5-point Likert scale used for the benefits. To compare the mean number of constraints between people with and without disabilities, the number of times that a respondent expressed agreement or strong agreement with a particular item was summed. Items were chosen based on Sutton's as well as Fedler and Ditton's (2001) research in a recreational fishing context. Additional items were derived from studies on outdoor recreationists with disabilities (e.g., Burns & Graefe, 2007; McCormick, 2001; West, 1984; Williams et al., 2004).

Statistical Analyses

To compare differences between anglers with and without disabilities, we segmented the sample into two groups based on their self-reported disability level using official standards set by the German government. These standards describe the impact of a person's disability on social life participation on a scale from 0 to 100. One group consisted of anglers owning a so-called severely handicapped pass, which indicates a disability degree of at least 50 (hereafter referred to as people with disabilities). These anglers were contrasted to anglers who were reported by their clubs as not having a physical disability and who did not possess a severely handicapped pass (hereafter referred to as people without disabilities).

Differences between these groups regarding benefits, constraints, and number of constraints were assessed by using ANCOVAs with the potentially confounding variable age of the respondent as a covariate (i.e., anglers with disabilities were significantly older than anglers without a disability, see results). An interval scale for the Likert scores (Fedler & Ditton, 1994) was assumed. We contrasted all other measured data between angler groups by t-tests. To identify underlying benefit and constraint domains, items were subjected to exploratory factor analyses with principal component extraction and varimax rotation. In factorial analyses, factor loadings greater than 0.5 were considered meaningful. Factors were examined with reliability analyses to justify creation of benefit or constrain domains. We only calculated a combined score if the Cronbach's α score (Cronbach, 1951) exceeded 0.7. If exploratory factor analyses and reliability analyses found subdimensions for a scale, a latent domain score was calculated as the average of the items forming the factor. To calculate factor scores, we only used data if anglers answered at least 50% of items that formed

a factor. The degree of agreement with a particular domain relative to other domains for a given angler segment was assessed by Wilcoxon signed rank tests for dependent samples. For all statistical tests the type-1-error probability α was defined as $p \leq .05$. We conducted analyses with SPSS version 14.0.

Results

Nine hundred ninety-two questionnaires were returned, 101 questionnaires were undeliverable, and 38 were returned unanswered. The corrected response rate was 67%. Twenty three questionnaires without information on disability status were excluded from further analysis. We excluded an additional 156 questionnaires because respondents indicated they were not severely disabled, although they had been declared as having some degree of disability by their angling clubs. Of 775 anglers who gave usable answers, 347 (45%) had a physical disability while 428 (55%) lived without a disability. Among survey respondents, the majority of anglers with disabilities (67%) exhibited an exceptional walking disability, and 16% had a substantial walking disability. The sample of anglers living with a disability, thus, encompassed mainly people with mobility-related disabilities. Nearly half of the respondents with disabilities (49%) indicated that they needed special devices (e.g., wheelchairs, special angling tackle) and structural modifications at the fishing sites or depended on help by other people to go fishing.

Comparing the demographics of these groups revealed a significantly higher mean age in anglers with disabilities compared to anglers lacking disabilities (see Table 1). Both angler groups were overwhelmingly male (>96%). More than three quarters of respondents with disabilities were not fully employed compared with only 29% among those without disabilities. Significantly more anglers with disabilities (74%) were pensioners/retirees compared with only 20% of anglers without disabilities. Anglers with disabilities also had a significantly lower median net monthly household income compared with respondents without disabilities.

Regarding leisure behaviour, anglers with disabilities participated in significantly fewer activities than anglers without disabilities (see Table 1). However, anglers with disabilities were significantly more experienced at fishing than anglers without disabilities. Both groups exhibited a similar fishing frequency as measured by annual angling days. However, angling frequency at their main fishery was significantly higher for anglers who had a disability compared with anglers who did not. Both angler groups reached their main fisheries most often on their own by car. Rarely were other means of transportation used, but it is worth noting that anglers with disabilities were significantly more often transported to the fishing site by angling partners or significant others and by public transportation compared to anglers without disabilities.

Anglers with disabilities expressed a significantly higher use frequency of fisheries with easy access compared to anglers without disabilities (see Table 1). Although both angler groups had similar preferences for target species using stationary bottom or float fishing techniques from shorelines or piers, anglers with disabilities reported significantly less frequent use of spin fishing techniques that demand more mobile fishing styles.

Benefits

Both groups experienced multiple benefits from fishing participation (see Table 2). Four latent benefit domains were identified: social interaction benefits, benefits for self-improvement, nature and relaxation-related benefits, and challenge-related benefits. On average, both angler groups realized benefits from all of these domains. The most important

TABLE 1 Demographic and Angling-related Characteristics of Anglers with and without Disabilities

	With disabilities			Without disabilities			
Trait	Value[a]	*SD*	*n*	Value[a]	*SD*	*n*	Statistics
Demographics							
Age (years)	58.1	14.1	345	47.5	15.0	426	$t = 10.04^{***}$
Males (%)	96.0		345	97.2		426	*ns*
Employment			333			409	$\chi^2 = 197.02^{***}$
Part time or by hour (%)	8.4			6.4			
Full time (%)	14.1			64.5			
None (%)	77.5			29.1			
Pensioners (%)	73.5		343	19.8		424	$\chi^2 = 221.77^{***}$
Net monthly household income (US $)	1926.5		84	2355.7		279	$U = 43627.50^{***}$
Leisure behavior focusing on recreational fishing							
Number of leisure activities including recreational fishing	2.0	1.1	322	2.3	1.2	410	$t = -4.12^{***}$
Angling experience (years)	44.3	16.3	339	35.7	15.1	421	$t = 7.60^{***}$
Annual number of angling days	47.6	53.9	344	44.8	45.6	427	*ns*
Annual angling days at the main fishery	33.2	41.3	327	26.4	28.7	416	$t = 2.65^{*}$
Proportion of angling days spent at the main fishery (%)	74.5	47.9	303	64.9	35.0	404	$t = 3.07^{**}$
Means of transportation to reach the main fishery[b]							
Self-driver by car	3.5	1.4	312	3.6	1.4	401	*ns*
By angling partner by car	2.1	1.1	246	1.9	0.9	357	$t = 2.57^{**}$
By non-angling partner by car	1.5	1.0	235	1.2	0.6	346	$t = 3.7^{***}$
By foot	1.8	1.2	245	1.8	1.3	365	*ns*
By bike	1.8	1.2	249	2.0	1.2	368	*ns*
By motorbike	1.2	0.8	236	1.2	0.6	351	*ns*
By public transportation	1.1	0.6	232	1.0	0.2	349	$t = 2.75^{**}$
Frequency of using easily accessible water bodies[a]	3.3	1.1	328	3.0	1.1	414	$t = 3.38^{***}$
Frequency of using a particular fishing method[b]							
Bottom fishing or float fishing	3.8	0.9	331	3.7	0.8	421	*ns*
Spin fishing	2.2	0.9	326	2.5	1.0	422	$t = -3.32^{***}$
Angling from shoreline or pier	3.6	1.0	329	3.5	1.1	418	*ns*
Top three species targeted (%)			319		410		*ns*
Carp (*Cyprinus carpio*)	57.7			52.2			
Northern pike (*Esox lucius*)	52.0			55.9			
Eel (*Anguilla anguilla*)	41.7			39.5			

[a]Mean, median, or percent of total.
[b]Frequency scale ranged from 1 = never to 5 = always.
ns = not significant. $^{*}p \leq .05$. $^{**}p \leq .01$. $^{***}p \leq .001$.

TABLE 2 Anglers with and without Disabilities' Agreement with Benefits of Recreational Fishing[a]

	With disabilities			Without disabilities			
Benefits	Mean	*SD*	*n*	Mean	*SD*	*N*	Statistics
Social (factor 1; eigenvalue = 7.7; variance explained 28.6%; Cronbach's α = 0.87)							
Domain mean score	3.7	0.6	328	3.6	0.6	419	F = 6.63**
Sharing nice experiences with others	4.0	0.7	323	3.9	0.7	419	*ns*
Having contact to other people	3.9	0.7	330	3.7	0.8	418	F = 8.83**[b]
Colleagueship, supporting each other	3.9	0.7	327	3.7	0.8	419	F = 6.71**[b]
Being together with friends	3.8	0.8	330	3.7	0.8	417	*ns*
Making new friends	3.5	0.7	325	3.3	0.8	415	*ns*
Development of tight social bondings	3.3	0.7	323	3.1	0.8	415	*ns*[b]
Self-improvement (factor 2; eigenvalue = 2.5; variance explained 9.2%; Cronbach's α = 0.81)							
Domain mean score	3.2	0.7	323	3.1	0.7	419	F = 7.06**
Training of mental abilities	3.3	0.9	322	3.3	0.9	417	*ns*[b]
Enhancement of self-esteem/self-confidence	3.4	0.9	321	3.2	0.9	418	F = 4.92*
Training of physical abilities	3.3	0.9	324	3.2	0.9	418	F = 5.38*
Self-determination	3.2	0.9	319	3.1	0.9	416	F = 5.83*
Self-conquest	2.9	0.9	318	2.7	0.9	416	F = 5.86*[b]
Nature experience and relaxation (factor 3; eigenvalue = 2.0; variance explained 7.5%; Cronbach's α = 0.80)							
Domain mean score	4.4	0.5	333	4.4	0.5	419	*ns*
Relaxation and recreation	4.5	0.6	338	4.5	0.6	419	*ns*
Understanding nature	4.4	0.6	327	4.3	0.6	416	F = 3.98*
Experiencing silence	4.4	0.6	335	4.4	0.6	419	*ns*[c]
Nature experience	4.3	0.6	326	4.3	0.7	419	*ns*
Challenge (factor 4; eigenvalue = 1.3; variance explained 5.0%; Cronbach's α = 0.72)							
Domain mean score	3.5	0.7	323	3.5	0.6	420	*ns*[c]
Feeling of success	3.8	0.7	328	3.8	0.8	414	*ns*[c]
Thrill	3.7	1.0	325	3.6	0.9	419	F = 3.96*[c]
Adventure	3.3	1.0	324	3.5	0.9	417	*ns*[c]
Feeling of acceptance	3.2	0.9	318	3.1	0.8	420	F = 4.23*
Single items without clear factor loadings							
Experiencing the catch of fish	3.9	0.6	326	3.9	0.6	415	*ns*[c]
Getting away from every day life	3.7	1.0	325	3.9	0.9	419	*ns*[c]

(Continued on next page)

TABLE 2 Anglers with and without Disabilities' Agreement with Benefits of Recreational Fishing[a] *(Continued)*

	With disabilities			Without disabilities			
Benefits	Mean	*SD*	*n*	Mean	*SD*	*N*	Statistics
Experiencing new and different things	3.6	0.8	325	3.5	0.8	419	*ns*
Enjoying solitude	3.6	1.0	326	3.6	1.0	419	*ns*
Family experiences	3.4	0.9	324	3.3	1.0	418	*ns*
Self-supply with fresh fish	3.5	1.0	331	3.4	1.0	417	*ns*
Tolerance by others	3.4	0.8	318	3.2	0.7	416	$F = 11.35^{***}$
Positive outcomes for my daily work	3.3	0.9	315	3.3	0.9	418	*ns*

Note. Agreement scale ranged from 1 = strongly disagree to 5 = strongly agree; benefit items are arranged according to benefit domains determined by factorial analyses and reliability analyses along with some benefits without clear factor loadings.

[a]ANCOVA results with age as a covariate.

[b]Positive age effect ($p \leq .05$).

[c]Negative age effect ($p \leq .05$).

ns = not significant. $^{*}p \leq .05$. $^{**}p \leq .01$. $^{***}p \leq .001$.

benefit of recreational fishing experienced similarly by both angler groups was nature experience and relaxation (see Table 3), with a mean domain score of 4.4. Both groups derived lower benefits from the social domain followed by challenge aspects. The least yet still positive beneficial outcome of the fishing experience was related to self-improvement. Compared to anglers without disabilities, anglers with disabilities indicated significantly greater agreement with social benefits and the benefits for personal development and growth associated with recreational fishing (see Table 3). No differences were found between groups in overall agreement with the challenge seeking benefits of recreational fishing.

Between anglers with and without disabilities, the level of agreement with individual benefit items significantly differed for 10 of 27 benefit items (see Table 2). These differences mainly concerned social benefits such as colleagueship, supporting each other, and having

TABLE 3 Comparison of Average Agreement Level with the Different Benefit Domains for Anglers with and without Disabilities[a]

		Social	Self-improvement	Nature experience and relaxation
Social	With disabilities	—	$Z = -11{,}531^{***}$	$Z = -14{,}074^{***}$
	Without disabilities	—	$Z = -13{,}216^{***}$	$Z = -16{,}553^{***}$
Self-improvement	With disabilities	—	—	$Z = -15{,}304^{***}$
	Without disabilities	—	—	$Z = -17{,}605^{***}$
Challenge	With disabilities	$Z = -6{,}046^{***}$	$Z = -8{,}010^{***}$	$Z = -14{,}440^{***}$
	Without disabilities	$Z = -2{,}960^{**}$	$Z = -11{,}472^{***}$	$Z = -16{,}727^{***}$

[a]Assessment by Wilcoxon signed rank tests for dependent samples; every benefit domain is tested relative to other domains within each angler group.

$^{**}p \leq .01$. $^{***}p \leq .001$.

contact to other people as well as self-improvement benefits such as training of physical abilities and increased self-esteem and self-confidence. Anglers with disabilities also indicated greater benefits associated with acceptance and tolerance by others. None of the ratings toward individual benefits were significantly higher for people without disabilities. All statistics in Table 2 controlled for potential age effects.

Constraints

More than half of respondents with disabilities (56%) indicated having experienced constraints to their recreational fishing participation during the previous fishing season at their main fishery. In contrast, significantly fewer anglers without disabilities (46%) indicated having experienced such constraints ($\chi^2 = 8.67$; $p \leq .05$). Similarly, the mean number of items ($\pm$ *SD*) which were affirmatively rated as being constraining was 3.7 ± 4.3 for anglers with disabilities ($n = 320$), which was significantly higher than the 2.6 ± 3.4 for anglers without disabilities ($n = 411$; $F = 18.57$; $p \leq .001$; no significant effect of age as a covariate).

We identified four constraint domains that were consistent with previous classification systems for constraints in outdoor recreation studies (see Table 4). These domains included intrapersonal constraints (i.e., mainly related to insecurity and risk), two constraint domains related to structural constraints (i.e., fish catch and access), and an interpersonal constraint domain. None of the average scores for these constraint domains exceeded the neutral average score of 3.0. There was considerable variability in answer scores as indicated by the standard deviations of mean constraint domain scores.

Among the four constraint domains, catch-related structural aspects were most constraining for anglers with disabilities followed by access constraints, interpersonal, and intrapersonal constraints (see Table 5). The catch-related constraint was also the most important constraint type for anglers without disabilities. The accessibility and the interpersonal constraint domains were perceived to be constraining similarly. Agreement with the intrapersonal constraint domain was rated as the least constraining aspect by both angler groups.

Some constraint items did not load highly on any of these four major constraint domains, but several constraints exhibited average agreement scores exceeding the neutral category (see Table 4). These items included health reasons constraining fishing for anglers with disabilities and having time constraints (e.g., family, work) for people without disabilities.

After controlling for potential age effects, the mean score of constraint statements differed for 14 out of 28 items (see Table 4). Particularly pronounced were the differences related to access issues (e.g., too few fishing sites at the shoreline, accessing the water body too difficult, local services insufficient, night fishing too complicated), inter- and intrapersonal items emphasizing the risks at the water side and the lack of suitable angling partners, and poor health. It is also worth noting that agreement with the interpersonal items "other resource users (e.g., boaters) constrained me" and "unpleasant reactions by other people were bothering me" were significantly higher for people with disabilities compared with people without disabilities. Only one item related to time constraints exhibited a significantly higher mean score for anglers without disabilities.

Discussion

Our study provided three insights into the meaning, importance, and difficulty of participating in recreational fishing activities for people with disabilities. First, we found that people living with a physical disability were avid recreational fishers despite being confronted with

TABLE 4 Anglers with and without Disabilities' Agreement with Perceived Constraints[a]

	With disabilities			Without disabilities			
Constraints	Mean	*SD*	*n*	Mean	*SD*	*n*	Statistics
Intrapersonal (factor 1; eigenvalue = 8.1; variance explained 28.9%; Cronbach's α = 0.84)							
Domain mean score	2.2	0.7	157	1.9	0.7	194	$F = 6.17^{*b}$
There was the possibility/risk that something happens to me (e.g. accident)	2.7	1.2	158	1.9	1.0	194	$F = 26.01^{***b}$
I did not feel safe at the water	2.5	1.1	160	1.9	1.0	195	$F = 12.44^{***b}$
My family did not want to go fishing with me	2.4	1.1	154	2.3	1.1	194	ns^{b}
I had no suitable angling partner	2.4	1.0	156	1.9	0.9	193	$F = 5.03^{*b}$
I did not like to be alone	2.0	0.9	157	1.8	0.9	193	ns^{b}
I did not have sufficient fishing skills	1.9	0.9	158	1.8	0.9	192	ns^{b}
Others advised me not to go fishing	1.8	0.9	158	1.6	0.7	194	ns^{b}
Access (factor 2; eigenvalue = 2.1; variance explained 7.6%; Cronbach's α = 0.81)							
Domain mean score	2.9	0.8	162	2.3	0.8	193	$F = 28.80^{***b}$
There were too few fishing sites at the shoreline	3.3	1.3	161	2.8	1.3	196	$F = 12.12^{***}$
Accessing the water body was too difficult	3.2	1.2	162	2.3	1.2	194	$F = 35.96^{***b}$
Launching of a boat was too difficult	2.9	1.3	151	2.3	1.3	191	$F = 7.20^{**b}$
I could not afford (money) to fish more	2.8	1.1	165	2.3	1.1	195	$F = 8.21^{**}$
The water body was too far away	2.7	1.1	161	2.2	1.1	192	$F = 4.45^{*b}$
Local services (e.g., boat rental, facilities for family members) were insufficient	2.6	1.1	156	2.2	1.1	188	$F = 4.39^{*}$
Night fishing was complicated or prohibited	2.6	1.1	156	2.1	1.1	190	$F = 6.00^{*b}$
Fish catch (factor 3; eigenvalue = 1.8; variance explained 6.5%; Cronbach's α = 0.79)							
Domain mean score	2.6	0.8	157	2.3	0.8	194	$F = 5.56^{*}$
The fishing sites were too crowded	2.9	1.1	162	2.7	1.2	195	*ns*

(Continued on next page)

TABLE 4 Anglers with and without Disabilities' Agreement with Perceived Constraints[a] *(Continued)*

	With disabilities			Without disabilities			
Constraints	Mean	*SD*	*n*	Mean	*SD*	*n*	Statistics
Domain mean score	3.1	1.0	164	3.1	0.9	192	*ns*
I did not catch as many of my target fish species as I would like to	3.5	1.1	161	3.3	1.2	192	*ns*
I did not experience enough fish strikes	3.0	1.1	164	3.1	1.1	188	*ns*
The fish of my target species that I catch were too small	3.0	1.1	157	2.8	1.2	191	*ns*[b]
Interpersonal (factor 4; eigenvalue = 1.6; variance explained 5.7%; Cronbach's α = 0.73)							
Other anglers' behavior disturbed me	2.6	1.0	161	2.4	1.1	193	*ns*
Other resource users (e.g., boaters) constrained me	2.5	1.1	158	2.2	1.1	194	$F = 5.66^{*}$
Unpleasant reactions by other people were bothering for me	2.4	1.1	156	2.0	1.1	193	$F = 6.79^{**}$
Single items without clear factor loadings							
Health reasons constrained my fishing	3.8	1.2	173	2.1	1.1	198	$F = 108.33^{***}$[b]
In addition to my main fishery, there were other good fisheries Gewässer	3.4	0.9	160	3.4	1.0	192	*ns*
I had time constraints (family, work etc.)	3.1	1.1	160	4.1	1.1	197	$F = 58.74^{***}$[c]
The existing fishing regulations (e.g. size and bag limits) did not suit me	2.9	1.2	163	2.6	1.2	191	*ns*[b]
The weather was not appropriate	2.7	1.0	162	2.4	1.0	193	*ns*[b]
Angling (with necessary preparation) means too much effort	2.5	1.0	159	2.3	1.0	193	*ns*[b]
Other leisure activities take up too much time	2.5	1.1	155	2.7	1.2	193	*ns*

Note. Agreement scale ranged from 1 = strongly disagree to 5 = strongly agree; constraint items are arranged according to constraint domains determined by factorial analyses and reliability analyses along with some constraints without clear factor loadings.

[a] ANCOVA results with age as a covariate.

[b] Positive age effect ($p \leq .05$).

[c] Negative age effect ($p \leq .05$).

ns = not significant. $^{*}p \leq .05$. $^{**}p \leq .01$. $^{***}p \leq .001$.

TABLE 5 Comparison of Average Agreement Level with the Different Constraint Domains for Anglers with and without Disabilities[a]

	Intrapersonal	Access	Fish catch
Intrapersonal			
With disabilities	—	$Z = -8{,}569^{***}$	$Z = -9{,}258^{***}$
Without disabilities	—	$Z = -8{,}233^{***}$	$Z = -11{,}240^{***}$
Access			
With disabilities	—	—	$Z = -3{,}785^{***}$
Without disabilities	—	—	$Z = -9{,}030^{***}$
Interpersonal			
With disabilities	$Z = -5{,}789^{***}$	$Z = -3{,}627^{***}$	$Z = -6{,}474^{***}$
Without disabilities	$Z = -7{,}520^{***}$	*ns*	$Z = -8{,}513^{***}$

[a] Assessment by Wilcoxon signed rank tests for dependent samples; every benefit domain is tested relative to other domains within each angler group.

ns = not significant. $^{**}p \leq .001$.

personal challenges such as poor health and reduced mobility. Anglers with disabilities appeared to focus more on recreational fishing as their leisure activity of choice as indicated by the significantly lower number of leisure activities pursued by anglers who had a disability compared to those without a disability. Second, general constraints to becoming an angler appeared to be overcome as indicated by regular participation in recreational fishing. Recreational fishing offered more and different benefits to people with disabilities compared to anglers without disabilities, particularly related to improved social relationships, self-improvement, and personal growth. Finally, we found that compared to people without disabilities, anglers who had disabilities faced more and different constraints such as access and mobility related structural constraints, various interpersonal constraints associated with social stigma and lack of suitable angling partners, and some intrapersonal constraints such as those related to insecurity, risk, and poor health. Overall, strong support was found for the two hypotheses tested in our study. The differences in benefits and constraints between the anglers with and without disabilities were evident after controlling for a potential age effect. Thus, disability status rather than the differential age was the salient factor responsible for the observed differences in benefits and constraints among both angler groups.

Anglers with and without disabilities exhibited similar angling frequency and preferred the same target species. This finding seemed to indicate that after having successfully negotiated some basic constraints resulting in the decision to engage in recreational fishing, people with disabilities can develop or maintain angling lifestyles and associated fishing preferences that do not differ substantially from the fishing activity patterns and preferences of anglers without disabilities. However, anglers living with a disability preferred easily accessible fisheries and spent significantly more time at one particular main fishery compared to anglers who had no disability. Anglers with disabilities likely choose their main fishery based on easy and safe accessibility. Because of the limited mobility of this group, few suitable substitute sites may be available. Other challenges to going fishing might result from the higher age and the fewer monetary resources of anglers with disabilities. At the same time, however, anglers with disabilities had more available time for fishing due to their significantly higher unemployment and retirement rates compared with those anglers without disabilities. This time issue might have facilitated the similar angling frequency expressed by both groups in our study, which corroborated findings by McCormick (2001) for nature-based recreation activities in the United States.

Participation in recreational fishing presents an opportunity to pursue and meet several important psychological and physiological needs (Driver & Cooksey, 1977; Driver & Knopf, 1976; Manfredo et al., 1996; Manning, 1999). We confirmed that angling offers both catch and noncatch related benefits (cf. Ditton, 2004; Fedler & Ditton, 1994). We found aspects of the nature experience and relaxation to constitute the only type of benefits that was realized similarly by both angler groups. The importance of nature experience and relaxation as motive to engage in recreational fishing has been previously shown for different angler populations (e.g., Arlinghaus & Mehner, 2004; Fedler & Ditton, 1994). These escape and relaxation related benefits seem to be universally important for angler populations world-wide (Ditton, 2004; Driver & Knopf, 1976).

Remarkable in this study was, however, that the social benefits associated with recreational fishing and the psychological benefits of self-improvement were realized to a significantly greater extent by anglers with disabilities compared with anglers without disabilities. Similar results were found in an investigation of integrated canoe adventure programs for people with and without disabilities in the northern United States (Anderson et al., 1997). These findings suggest that the function of recreational fishing for fostering social capital (Freudenberg & Arlinghaus, 2008) seems to be particularly relevant for people with disabilities. Our study also provided quantitative evidence to show that anglers with disabilities realize benefits related to enhancement of personal worth, which positively influences self-esteem, self-confidence, and the ability to test and overcome feelings of inferiority. Enhanced self-perception, better physical and social abilities, and stronger feelings of social acceptance through participation in several leisure activities including angling have previously been reported by Blinde and McClung (1997) in a study on students with spinal cord injuries in the United States. Our study confirmed these findings for an older population with disabilities in a recreational fishing context. The role of outdoor recreation for fostering social cohesion and enhanced self-esteem among people with disability seemed valid across various nature-based outdoor recreation activities and different age groups, but this assumption needs to be studied further.

Benefits realized from recreational fishing were higher for anglers with disabilities than for anglers without disabilities. Based on our findings and in agreement with McAvoy (2001), participation in recreational fishing is of similar or greater social-psychological importance for anglers with disabilities compared to anglers without disabilities. Society may be able to capitalize on the positive role of recreational fishing for people with disabilities to increase social and psychological well-being within angler communities.

We found that anglers living with a disability experienced a greater number of constraints and were more constrained overall compared to anglers who had no disabilities, which was similar to other studies on outdoor recreation and people with disabilities (e.g., Burns & Graefe, 2007; West, 1984; Williams et al., 2004). The item-by-item analysis revealed that anglers with disabilities indicated a greater degree of constraints with most of the presented structural, interpersonal and intrapersonal items. Only lack of time was significantly more strongly constraining for people without disabilities. This result was consistent with studies by Burns and Graefe (2007) and McCormick (2001) in other leisure contexts. Anglers with disabilities appeared not to have as many work-related duties compared to anglers without disabilities (McCormick, 2001; Williams et al., 2004) and likely had more free time for leisure activities (Burns & Graefe, 2007).

Our study showed that anglers irrespective of degree of disability felt mainly constrained in their fishing frequency by insufficient catches and fish strikes. These findings deviated strongly from previous studies on constraints to fishing in the United States and Australia (Fedler & Ditton, 2001; Ritter et al., 1992; Sutton, 2007). Presumably, the abundance of fish is higher in less populated, and thus potentially less overfished areas in the

United States or Australia such that unsatisfactory catches is a constraint particularly to German anglers. Previous research from Germany confirmed that catch aspects of the fishing experience predominantly determine fishing satisfaction (Arlinghaus, 2006; Arlinghaus, Bork, & Fladung, 2008; Arlinghaus & Mehner, 2005). Although the primary motivations to go fishing are typically noncatch related (Fedler & Ditton, 1994), catching fish remains a necessary component of the fishing experience (Arlinghaus, 2006). Our study showed that unsatisfactory fish catches negatively influence fishing frequency of anglers with and without disabilities to the same degree. With angler satisfaction constituting the ultimate product of the angler experience (Arlinghaus, 2006; Hendee, 1974), our study emphasized the importance of quality catch opportunities for increasing fishing participation and enhancing the total benefits attained by anglers with and without disabilities.

Differences were found between anglers with and without disabilities regarding catch-independent structural constraints related to access to fishing sites, which were significantly more constraining factors for those who had a disability. This finding also has been reported by Burns and Graefe (2007) and McCormick (2001) in other leisure contexts in the United States. The impaired health of persons having a disability along with limited mobility is a likely explanation for these findings (Burns & Graefe, 2007; Finch et al., 2001; McCormick, 2001). Similarly, in our study anglers with disabilities emphasized health reasons as important for reduced fishing frequency. They also reported that transport by others and special devices were often needed to access fishing sites.

In addition to structural constraints related to catches and access, our research found significant differences in perceived interpersonal constraints between anglers with and without disabilities, which also corroborated earlier findings (e.g., West, 1984). Interpersonal constraints experienced by respondents having a disability predominantly related to other anglers' behavior or unpleasant reactions by other people. Moreover, the lack of a suitable angling partner hindered anglers with disabilities more strongly compared to anglers without disabilities. These differences between both groups showed that stigmatization and unpleasant social interactions may negatively influence the recreational experience of anglers with disabilities (Bedini, 2000).

Intrapersonal constraints such as feelings of insecurity and risk of injury were found to constitute the least meaningful constraints to impact fishing frequency. This finding was not surprising because active participants in recreational fishing were studied. The structural model of leisure constraints emphasizes that intrapersonal constraints are particularly important prior to taking the decision to engage in a given recreational activity (Crawford et al., 1991). However, we found that intrapersonal constraints played a significantly greater role for anglers with physical disabilities compared to anglers without disabilities mainly related to feelings of insecurity and risk. Similarly, Henderson, Bedini, Hecht, and Schuler (1995) suggested that women with physical disabilities mentioned feelings of risk and insecurity to be constraining factors for leisure participation. Fear to be outdoors was also more strongly expressed by people with disabilities participating in national park recreation in Oregon and Washington compared to people without disabilities (Burns & Graefe, 2007). Apparently people with disabilities participating in outdoor recreational activities often perceive the issue of risk and insecurity to a greater extent compared to people without disabilities.

Implications

Further management action is necessary to make nature-based leisure participation more attractive for people with disabilities as these segments of society strive to have the same access to recreation as those individuals without disabilities (Farbman & Ellis, 1987).

To this end, barriers to participation in recreational activities for people with disabilities should be reduced to give them the possibility to be free in choice (McGuire et al., 1992). For anglers with disabilities, problems could be reduced by special permissions for use of access routes to fishing sites, particularly if they are remote. Barrier-free designed paths and fishing sites also can be promoted. Related safety precautions (e.g., protection from falling into the water) should always be considered (McGuire et al., 1992). Because catching fish was a general determinant for angler satisfaction (Arlinghaus, 2006) and was found to be particularly constraining fishing participation in our study, barrier-free access should be ensured at places where angling catches are promising (cf. McGuire et al.).

Looking ahead, the needs of people with disabilities should be proactively considered in the design of management actions (Farbman & Ellis, 1987; Williams et al., 2004), and these individuals should be given the possibility to take part in management planning (Brown, Kaplan, & Quaderer, 1999). Our study emphasizes that recreational fishing is of special social and psychological value for people with disabilities. At the same time, these people are constrained to a greater degree, which reduces participation in the activity to less than desired levels. Although many leisure constraints can be negotiated (Henderson et al., 1995; Jackson et al., 1993), negotiations may be facilitated through the advancement of social structures (Bedini, 2000; Devine, 2004; Lord & Patterson, 2008; Mactavish & Schleien, 2004; Shaw, Bonen, & McCabe, 1991), such as in angling clubs and other social community organizations. To this end, angler organizations may play a key role in Germany because in this jurisdiction with private fishing rights, many waters are only accessible through membership in angler organizations (Freudenberg & Arlinghaus, 2008). However, not just an intraorganizational approach but also an interorganizational and organization-independent approach is necessary to conceptualize plans for managers of aquatic ecosystems and land use planners and allow them to proactively take into account the needs and wishes of people with disabilities.

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