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Research Article

Matching destination difficulty and participant capability in outdoor recreation and tourism: role of third-party certifications for 15 activities in 52 countries

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ABSTRACT

For safety and satisfaction in outdoor recreation and tourism, participant or client capability must match destination difficulty. Social trends have increased demand by inexperienced clients. Tour operators and tourists rely on third-party difficulty gradings and participant skill certifications. These operate as autonomous information sources within destination matching. We analyse their significance using iterative thematic analysis of participant observations by 14 coauthors for 15 activities in 52 countries. We find that certifications are used at 5 scales: destination, infrastructure, tour operator, guide or instructor, and individual clients. Currently, guide certification is most widespread. We propose that site grading and client certifications may expand, with increasing regulation and training. Drivers of expansion include insurance, marketing, adoption of outdoor recreation and tourism in healthcare, and legal permitting and insurance requirements for access to public and private parks and other lands.

Management summary

Destination difficulty gradings and client capability certifications are increasingly important in outdoor recreation and tourism,

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driven by new demand, destination matching, mental healthcare, and land management. Destination match envelopes for any activity can be extended either (a) by improving client capability via training, or (b) by reducing destination difficulty via site infrastructure. Guide skills can compensate for both, but to a limited degree. Site gradings and capability certifications can play a broader role in benchmarking skills, and providing legal backup for guides and enterprises. There are opportunities to extend site difficulty gradings to new activities, and link client capability certifications to training programs.

1. Introduction

"Too far toward caution and I'm killing dreams … too far towards risk and I may be killing people" (O'Keeffe in Chaffer, 2014).

Many outdoor recreation and tourism activities and products involve active participation, and hence are only available to people with relevant skills and capabilities. Plans and bookings must therefore match the capability of the clients or participants, to the degree of difficulty of the site or destination. This requirement does not apply for most other forms of leisure and tourism, which are available to anyone who can afford them. Here we analyse: problems arising from inadequately qualified clients; measures adopted by tour operators to assess client capabilities; steps taken by clients to assess their own capabilities for particular products; and the roles of site difficulty gradings and participant capability certifications.

This seems to be a novel topic, without its own specialist framework. There are multiple relevant fields, reviewed below. We therefore adopted a qualitative methodology, a multi-author, participant-observation ethnography and autoethnography, using thematic analysis. The 14 authors are current or former outdoor guides and instructors as well as individual participants and tour clients. Each is skilled in different sets of activities. Our data were derived from tens of thousands of individual tourists, engaged in 15 activities, across 52 countries. We used a multi-stage technique for data compression and analysis. Each author first wrote vignettes for each of their preferred activities, based on participant observations of recreational activities, tourism products, trip participants, and tour clients. We treated those vignettes as textual materials for basic and axial thematic analysis and coding. We followed the APA JARS-2 protocol for qualitative research, with three complete co-created multi-author iterations of thematic analysis. This is a broad but robust and reliable approach.

2. Social trends and industry context

Outdoor recreation and tourism is continually growing and evolving, with annual turnover in the trillions of dollars worldwide (Buckley, 2010; Buckley & Cooper, 2023; Pomfret et al., 2025). Growth has created financial gains for tourism enterprises and destinations, and health benefits for tourists, albeit with environmental costs (Buckley et al., 2025; Su et al., 2025). Entire tourism destinations, as well as individual enterprises, now adopt adventure-oriented marketing, using terms such as adventure capitals, experiences and mindsets.

This expansion, however, has created a new internal obstacle. Driven by desires for self-esteem and social capital, some clients visit destinations and purchase products beyond their capabilities, expecting that tour operators and guides will compensate for their deficiencies. Tourists exaggerate their skills, and travel agents book unskilled clients, shifting the burden to guides and instructors. That creates risks, costs, and dissatisfaction. This effect could be reduced if tour clients could accurately assess destination difficulty, and tour operators could accurately assess client capability. To match client capabilities to destination difficulties, adventure tourists and tour operators rely on autonomous sources (Beerli & Martin, 2004), notably national and international site-scale degree-of-difficulty gradings, and individual client and participant capability certifications, for specific adventure activities.

This process is driven by three social trends specific to outdoor recreation and tourism. First, individual expectations and behaviours have evolved from serious leisure careers, to the experience economy. Under the serious leisure model, individuals select a single preferred outdoor activity, and improve their skills gradually through lifelong practice (Stebbins, 1988), driven by self-esteem (Buckley, 2018). They choose successive holiday trips or tours to provide opportunities for the same activity, but at higher skills levels, in more difficult destinations. Under the experience economy model, people purchase all-inclusive products, where tour operators provide specialised equipment, clothing, and guides and instructors (Buckley, 2007; Buckley et al., 2015). For subsequent holidays, they purchase experiences in different activities, rather than the same activity at a higher skill level. They are driven at least partly by social capital (Gardiner et al., 2023; Frühauf et al., 2025). If the two models are mixed, then some tour or trip participants may be experienced, whilst others are complete beginners. This creates practical difficulties for tour providers and guides.

The second social trend is that demographic changes have created a cohort of older tourists with time and money, who buy tours from their personal bucket lists of outdoor activities and destinations, but who may no longer possess the same physical and mental capabilities as previously (Buckley & Underdahl, 2025). The third social trend is that as people recognise the role of outdoor recreation and tourism in mental health and wellbeing, they take trips or tours as a form of lifestyle medicine (Buckley & Cooper, 2025), without considering capability requirements. These social trends also lead to mixed abilities within groups.

These social and industry trends all lead to the same concern. For individual safety and satisfaction, and for commercial success and legal protection of tourism enterprises, it is increasingly important to match client and participant capabilities, to site and destination difficulty. Historically, this has been haphazard. Here, therefore, we analyse current patterns, and propose future research and management priorities. As outlined above, this concern is linked to multiple research fields, each with its own theoretical frameworks: adventure tourism, destination matching, quality certification, mental health, and land and parks management. We review each of these briefly below.

3. Theoretical frameworks and literature review

3.1. Adventure tourism research

Adventure tourism research is a rapidly growing field, with 585 journal articles from 2002 to 22 (Deb et al., 2023). A review of 253 articles over 29 years (Doran et al., 2022) found strong reliance on theoretical frameworks such as branding (Karagiorgos et al., 2023), motivations (Frühauf et al., 2025), and wellbeing (Farkic et al., 2025; Pomfret et al., 2023). Books include Buckley (2010), and Pomfret et al. (2025). A number of individual activities have been analysed previously (Buckley, 2007, 2018, 2019; Buckley & Cooper, 2023, 2025; Houge Mackenzie et al., 2023; Pomfret, 2021; Pomfret et al., 2025). One conceptual component of this research is the product pyramid (Buckley, 2007), with high-volume, low-price, low-skill, easy-access products as the base, and low-volume, high-price, high-skill, remote-access products at the apex. This contribution expands that concept by including third-party certifications.

3.2. Destination choice, marketing and matching

Most tourism activities are available at competing destinations, with multiple information sources and channels between destinations, enterprises, and tourists, differing in reliability, focus, and completeness. This is a large, longstanding, and heavily analysed field of tourism research (Cooper & Buckley, 2022; Dai et al., 2022; Huang et al., 2023; Lee & Park, 2023; Su & Li, 2024). Marketing mechanisms have changed

Table 1
Authors' positions, expertise, and experience across outdoor activities.

Age	Exp	FM	PGC	OUE	HT	CM	SN	WR	OK	SF	YS	DV
71	45	M	PGC	U	*		*	*	*	*	*	*
65	25	F	PC	OUE	*	*			*			
64	35	M	PGC	OE	*	*	*	*		*		
58	40	M	PG	OUE	*	*		*		*		
58	38	F	P	U	*	*	*					
54	36	F	PG	U	*		*	*		*	*	
52	34	F	PG	OU	*							*
50	40	M	PG	UE	*	*	*	*	*		*	*
46	24	F	PG	UE	*	*	*					
45	23	F	PGC	UE	*			*		*		
43	35	F	PGC	O	*	*	*		*			
42	20	F	PG	UE	*		*			*		
41	18	F	PG	OU	*							
26	10	F	PG	U	*					*	*	

Authors tabulated in descending order of age. Exp, total years of intensive outdoor experience. FM: F = female, M = male. PGC: P = participant or client, G = guide or leader, C = competitor or racer. OUE: O = company owner, park manager; U = university researcher; E = outdoor educator. HT, hiking, trekking, trail running. CM, climbing, mountaineering. SN, skiing, snowboarding, including backcountry. WR, whitewater rafting, kayaking. OK, seakayak, flatwater kayak, ocean racing surfski. SF, surfing, bodyboard, sailboard, kiteboard. YS, yachting, sailing. DV, diving, snorkel. Excluded: activities involving wheels (mountain bike), flight (hanggliding, skydiving), motors (off-road, 4WD), livestock (horse riding, dogsleds), consumption (fishing, hunting).

greatly over time. They now include: travel blogs (Gholamhosseinzadeh et al., 2023) and vlogs (Li et al., 2025); social-media posts; strategies aimed to attract influencers to advertise places and products (Luo et al., 2025); general-AI summaries written automatically by search engines; and AI chatbots that can lead a general enquiry towards a particular place and product (Hrankai & Mak, 2025; Kim et al., 2025; Ku, 2024). These approaches overlap, and tourists use them simultaneously. They also search for autonomous information (Beerli & Martin, 2004; Lian & Yu, 2019), such as independent videos of activities and destinations, and social media posts by practitioners (Nautiyal et al., 2023). Here we add the role of gradings and certifications to these autonomous sources.

3.3. Tourism quality assurance and certification

Certification systems are a specialised but significant field in tourism research (Lesar et al., 2023; Lesar & Weaver, 2024). The main focus is on social-benefit certifications such as fair-trade and eco-certificates (Buckley, 2013). Individual-benefit capability certifications are standard in many trades and professions, but have not been analysed previously in tourism. Here we show that site difficulty grading systems, and guide and participant skill and capability certification programs, are widespread in the adventure subsector. These gradings and certifications are run by third-party organisations, providing autonomous information for destination image (Liu et al., 2024) and destination matching (Cooper & Buckley, 2022). We analyse their current extent and importance in a range of outdoor recreation and tourism activities; and obstacles, opportunities and drivers for expanded adoption in future. We consider their significance in matching providers and purchasers, examine how and why they differ between activities, and demonstrate how they can be subverted.

3.4. Nature-based mental health and wellbeing

Holidays create happiness, and tourism can be therapeutic (Buckley, 2023), with benefits lasting well after return to work (Gump et al., 2021). Tourism can provide relaxation, eg in warm-climate beach resorts. It can provide sensory experiences, eg through gastronomy or nature (Buckley et al., 2024). It can also create powerful emotions (Murphy & Bastian, 2020), such as thrill (Heirene et al., 2016) and awe (Su et al., 2024). These sensory and emotional experiences improve wellbeing (Buckley & Cooper, 2025; Houge Mackenzie et al., 2023; Ritpanitchajchaval et al., 2023). Tourism is therefore considered as one component of lifestyle healthcare, and there are global efforts to adopt tourism within national healthcare policies (Buckley et al., 2023).

Research on the role of tourism in human health is extensive (Buckley, 2023; Hu et al., 2025; Jiang et al., 2025; Pomfret, 2021). It includes the therapeutic effects of adventure tourism in mental health (Farkic et al., 2025; Houge Mackenzie et al., 2023; Pomfret et al., 2023). Psychological mechanisms centre on emotions such as thrill and rush (Buckley, 2012; Cater, 2006). Prior research has shown gains in mental health and wellbeing from activities such as hiking (Buckley & Westaway, 2020), kayaking (Buckley, 2018), and surfing (Buckley, 2019; Buckley, Brough, & Westaway, 2018), with substantial economic scale (Buckley & Cooper, 2023). Those analyses demonstrated that mental health benefits are driven by multiple factors, including challenge, nature, social, and purpose.

Tourism can also overcome two major implementation obstacles for national-scale nature therapies (Buckley et al., 2023). First, ~30 % of urban populations in developed nations do not visit parks and nature at all, since they are unfamiliar with the outdoors, through lack of childhood experience (Buckley, Brough, & Westaway, 2018; Kondo et al., 2025). Outdoor tours overcome this obstacle by providing guides and logistics (Cooper & Buckley, 2022). Second, healthcare interventions funded by government or insurance are brief. Patients are expected to continue therapeutic practices after the intervention ends, but many do not (Buckley, Brough, & Westaway, 2018). As thrill is addictive (Heirene et al., 2016), adventure tourism is especially successful in creating this sustained behavioral change (Buckley & Cooper, 2025).

3.5. Lands and park management and liabilities

Outdoor recreation and tourism requires access to lands and waters suitable for the activities concerned. Those lands and waters have owners or management agencies that control access, set conditions, and may become defendants in any lawsuits. Public protected areas such as national parks, and other public lands such as forest reserves and coastal foreshores, are especially popular for mobile outdoor recreation and tourism. Many are managed with recreation as one legally defined function. Management agencies can regulate access and activities, including sites and seasons, group sizes, equipment, and safety skills (Leung et al., 2018; Dinica, 2022). They can charge fees, and invest in infrastructure. Generally, depending on land tenure type, they are keen to encourage independent outdoor recreation in order to benefit visitor mental health. They may or may not allow commercial outdoor nature and adventure tourism enterprises, sometimes known as outfitters, to operate under permit. Permit conditions typically include indemnities and insurance requirements, but if tour operators become bankrupt, governments may still find themselves liable. Therefore, it is in the

Table 2
Participant observations by activity and country.

Country	Trek, hike	Climb mntn	Ski, board	Raft, kayak	Sea-kayak	Surf, kite	Sail	Dive
Argentina		*		*				
Azerbaijan	*							
Australia	*	*	*	*	*	*	*	*
Belize								*
Cambodia								*
Canada	*		*	*				
Chile	*			*		*		
China	*		*	*				*
Costa Rica	*			*				
Cuba								*
Ecuador	*			*		*		
Egypt								*
Faeroes							*	
Finland	*			*				
Fiji					*	*		*
France	*	*	*	*				
Georgia	*		*					
Greece		*						
Iceland								*
India			*	*				
Indonesia	*	*				*		*
Iran	*	*						
Italy		*						
Japan	*		*	*				
Kenya	*	*						
Maldives						*		*
Malta	*	*						*
Mauritius								*
Mexico								*
Nepal	*	*	*	*				
New Zealand	*	*	*	*	*	*	*	*
Norway	*		*	*	*			
Oman	*							*
Peru	*			*				
Papua New Guinea	*				*			*
Philippines								*
Portugal						*	*	
Rwanda	*							
Samoa						*		*
Solomon Islands						*		*
South Africa	*	*					*	*
Spain	*	*						*
Switzerland			*					
Taiwan	*							
Tanzania	*	*						*
Thailand		*			*			*
Turkey				*	*			*
Tuvalu								*
Uganda				*				
United Kingdom	*	*	*	*	*	*	*	*
United States	*		*	*				
Vanuatu					*			*
Zimbabwe				*				

interests of these agencies, and other landowners allowing access for outdoor recreation, that participants and tour clients should possess adequate skills and capabilities, and that trip leaders and tour operators can demonstrate that they have checked these in advance.

4. Methods

4.1. Qualitative methodology

Since this appears to be a novel topic, qualitative methods are necessary in this initial investigation. There is no prior published research that is sufficiently specific to construct quantitative surveys. Since this is a global topic, we assembled a consortium of authors based in a range of regions, with joint experience across 52 countries, all continents, and a wide range of latitudes, elevations, landforms, ecosystems, land tenure systems, human cultures, and outdoor activity types. These authors possess expertise and experience as participants and clients, guides and leaders, company owners and land managers, in outdoor tourism, recreation, and education, as well as research.

Jointly, the authors have guided tens of thousands of individual outdoor tour clients, outdoor recreation and education participants, and park visitors, over many decades. Ethnographic and autoethnographic participant observations, recorded in trip notes, tour reports, journals, videos, photographs, and personal memories, constitute a large and diverse set of data that we draw on for this analysis. To express these data in a format suitable for iterative qualitative thematic analysis via basic and axial coding, we first had to compress and convert them to textual form. To achieve this, each author summarised their own participant observations in the form of vignettes for each of the activities in which they were engaged, and we then combined those vignettes as a single textual dataset.

Table 3a
Compliance with American Psychological Association criteria for reporting primary qualitative research.

APA JARS-Qual requirement	Compliance
Introduction	
identify key issues/topic	Information sources to match tourist activity capability to destination requirements
acknowledge conflicts of interest	None
problem/question/ objectives	Need information on site difficulty and participant skills for safety and satisfaction
review and critique literature	Summarises research in adventure tourism, destination matching, quality certification
identify key issues	Adventure sport tourism destinations require physical skills for specific activities
clarify knowledge gaps	Traditional destination marketing does not include necessary skills information
purpose of this study	Identify autonomous information sources including third-party grading and certification
target audience, if specific.	Researchers and practitioners in adventure sport tourism destinations and enterprises
rationale for design used	Qualitative analysis of participant observations for novel research question
approach (e.g. interpretive)	Interpretive thematic analysis, no directed-content or stakeholder-narrative
relation to prior publications	Prior publications consider skills matching for limited activities only
Methods	
researchers' demographics, culture	In each country, authors have same demographics and culture as participants
credentials, experience, training	Authors have prior publications and practical tourism industry experience
numbers of participants, documents	14 coauthors, 15 activities, 52 destinations, >200 enterprises, >10,000 tourists
participant characteristics	Participants in adventure tourism activities as guides, clients, or independent tourists
data sources (e.g., internet).	Participant observations, unstructured interviews, marketing materials, social media
interactions with participants	Only during this study
any prior ethical considerations	None
participant recruitment	Face-to-face in field
incentives or compensation	None
ethics and consent	Approved protocols
any attrition, reasons	Not applicable
rationale for endpoint (saturation)	Ample saturation across participants, activities, enterprises, destinations, countries
how study portrayed to participants	Transparently
participant selection (eg max variation)	Maximum variation
inclusion/exclusion criteria.	All tourists observed and interviewed across all products and enterprises involved
where data were collected	Adventure sport tourism destinations in 52 countries worldwide, plus online
transferability of findings	Results derived from multiple countries, cultures, and activities, so highly transferable
form of data (interviews, media)	Participant observations, unstructured interviews, social media posts
data-collection protocol	Observations and interviews become part of expert knowledge by coauthor participants
were others also present	Generally
number of times data collected	Many, per site, product, activity, observer, client
duration of data collection	Differs between destination, enterprise, activity, observer, but up to 50 years
interview time duration	Differs between tourists, but ranging from hours to weeks per trip in total
content and form of questions	Spoken or written, conversational, or driven by management concerns such as safety
recording methods, field notes	Pre-trip email messages, guide recollections, trip reports, social media materials
analytical methods (e.g., thematic)	Thematic coding
coding categories (emergent or a priori)	Emergent
analytic scheme (directed or emergent)	Emergent
illustrate/describe analytic scheme	Joint coding tree
indicate software, if used	No software
adequacy of data relative to goals	Amply adequate
findings grounded in evidence	Vignettes provided for each activity
findings insightful re literature	New data and insights on destination matching and quality certification
context (e.g., sites, participants).	Adventure sport tourism destinations worldwide
reconcile any discrepancies	No discrepancies
consistency, consensus, auditing	Consistent results across destinations, enterprises, activities, observers, and participants
triangulation of sources, investigators	Triangulation across countries, cultures, activities, investigators
thick or thin descriptions and data	Thick spoken and written data
Findings	
research findings (e.g., themes)	Same themes from all destinations and activities, summarised jointly in coding tree
meaning and understandings	Straightforward set of findings across all countries, cultures, activities
support findings via quotes, excerpts	Multiple vignettes by different observers for each activity
synthesis via diagrams, tables	Synthesis of themes in joint coding tree and schematic figure
central contributions and significance	Expanding role of third-party site grades and participant skills certifications
how findings can be utilized	Integrate activity training and certification with destination marketing and management
differences from prior theories	First analysis of third-party certifications in destination matching across activities
strengths	Large samples; comparisons across activities, countries and cultures; implementable
Limitations	Qualitative, no numerical information on distributions across sites and participants
scope of transferability	Transferable worldwide across activities, subject to laws on certification programs
any ethical challenges	None
future research, policy, practice	Linked training, certifications and site gradings will benefit enterprises and tourists

4.2. Author positionality and reflexivity

This is a co-created multi-author qualitative analysis. Therefore, the authors' experiences and positions are an important component of the methodology. There are 14 authors (Table 1), each with 1–6 decades experience, across a total of 15 activities (Table 2).

4.3. Data sources

We analysed 15 adventure tourism activities in 52 countries (Table 2): hiking, trekking, climbing, mountaineering, snowboarding, skiing, rafting, kayaking, riverboarding, seakayaking, sailing, kiteboarding, surfing, diving, and snorkelling. This is a subset of activities listed by Buckley (2007, 2010). We excluded adventure sports where the individual activity relies on machines (eg, off-road driving, trail bikes, jetskis, powerboats, aircraft) or livestock (eg, horse riding), and also those which are considered as extreme sports and not offered commercially, such as wingsuit basejumping. This broad database, derived from multiple observers with many decades of experience, provides a robust basis for analysis. Even though it is a qualitative analysis, this depth of data reveals trends and patterns across activities and regions, that would

Table 3b
Compliance with 10-step methodological protocol for specifying **saturation**.

Step	Compliance or comments
Define underlying discipline	Social sciences/qualitative interpretive thematic
Specify the target class precisely	Staff and clients of adventure tourism enterprises
Report case selection/exclusion	Snowball inclusion of participant observer coauthors
Minimise indirect selection bias	Restricted to activities with experienced observers
Report case hetero/homogeneity	Heterogenous cases as reported below
Report information elicitation	Coauthor recollected vignettes to compress data
Select code, meaning or model	Four major themes defined by meanings
Specify fineness or granularity	Granularity defined in coding tree and quotes
Randomisation in *post facto* tests	No statistical *post-facto* tests conducted
Precision in *post facto* tests	Not applicable.

not be apparent for single countries or activities.

4.4. Co-created iterative thematic analysis

We used iterative qualitative thematic analysis co-created from participant observations by 14 coauthors, with basic and axial coding, following the American Psychological Association (2018) JARS Qual-2 (Table 3) and 10-step saturation protocols (Buckley, 2022; Henninck & Kaiser, 2022). As a method to compress participant observation data from many hundreds of trips and tens of thousands of tourists, we wrote vignettes from records and recollections, and used those as a basis for textual analysis. The authors include clients and staff of adventure tourism enterprises, each writing from their own perspectives, across 5 languages and 1-6 decades. We made 3 complete co-created iterations of our analysis, each with multiple steps.

Table 4
Basic coding tree, across all adventure activities.

Theme	Subthemes
Adverse consequences if some clients lack claimed capabilities for activity at product level.	Loss of group cohesion, slow progress, extra guide work Safety risks to that individual and other clients and guides Logistics of separating group, emergency evacuations etc Financial, legal, insurance, and reputation costs and risks
Tour operator measures to match client capabilities to activity and product.	Advertise capability requirements for specific products Require resumé of experience, and medical declarations Provide training advice to clients, test skills on arrival
Tourist measures to match own capabilities to product and destination.	Autonomous information sources on skills requirements Select destination, enterprise, product to match own skills Train for activity-specific skills and general fitness
Role of site gradings and capability certifications in destination and product matching.	Tourists use site gradings to select destinations and products Destinations and enterprises use site gradings in marketing Tourists use capability certifications as skills benchmarks Tour operators require capability certifications for bookings Legal and insurance requirements for some activities Certifications for enterprises, instructors/guides, clients Client capability certifications are not always accurate

4.5. Validity and reliability

As a qualitative analysis, there are no quantitative or statistical measures of confidence. Validity and reliability are provided by the large and diverse dataset, derived systematically from participant observations by 14 experienced authors across 15 activities in 52 countries. Potential subjectivity was reduced by requiring authors to compress their observations to written vignettes. Potential recall bias is overcome since authors did not need to remember every part of their past experiences, but only to focus on powerful recollections associated with incapability of observed clients or participants. This appears to be the first analysis of this topic, and the approach taken generates hypotheses for future research, as well as findings relevant for management and stakeholders.

4.6. Ethical considerations

No individuals were identified and no individual characteristics are reported, other than those describing the authors (Table 1). Any material records are in the private possession of the individual authors, and only the vignettes written from memory were subject to thematic analysis. All data are thus generated by the authors, who consent to the co-created analysis. This research and publication are compliant with the principal and corresponding author's national and university Codes of Ethics for Human Research.

Table 5
Problems arising when clients lack adequate capabilities.

Activity	Illustrative Quotes
Trekking	*Unprepared tourists create challenges for safety, cohesion, and progress. They arrive fat, unfit, ill, injured, unequipped, and want us to carry their packs.* *We send them videos of what to expect, and require medical declarations, but they turn up with undeclared stents, heart bypasses, pulmonary problems, spinal surgery, knee braces, calipers, plantar fasciitis, even adult nappies.* *She forgot her medications and fell unconscious, we had to call a helicopter.* *She said she was 100 % fit, but took 19 h to hike a*6 h *section of track.* *We market to anyone with an 'adventurous mindset', so we get parents with kids, corporate and party groups, unfit, inexperienced, uninterested, and we have to keep them uninjured so they can boast about 'extreme' experiences.*
Climbing	*If some climbers have lower skills, that creates two groups to manage, which means extra risk since a guide can't be in two places at once.* *Some participants were unfit, unskilled, unmotivated, misrepresented training, stamina, and experience, and the guides had to send them home.*
Skiing	*Clients sign off that they can ski steep ungroomed treed terrain, but some can only ski open groomed runs, so we have to leave them at a ski resort.*
Rafting	*Some clients are unfit or can't swim well. Some show up with weak hearts or previously dislocated shoulders. They grab onto rocks, put everyone at risk.* *Some won't follow guide instructions. Military guys may ignore female guides.* *Too cautious, we kill our clients' dreams; too bold, we risk killing the clients.*
Seakayak	*Abel Tasman in New Zealand has kayak rentals, parks campsites, safe waters, and motorised water taxis that can evacuate anyone getting into trouble.*
Sailing	*People in their sixties want to go sailing, but overstate their abilities. They are unfit, have high blood pressure, can barely swim, and are not mentally sharp.*
Diving	*Many clients endanger everyone through poor physical health, inadequate diving skills, and outdated knowledge of diving equipment.* *Some clients arrive with inaccurate medical certificates signed by colleagues or themselves, or omitting critical information.* *Clients exaggerate experience and ability, have problems equalising pressure and adjusting buoyancy, and get distracted by photography.* *One client suffered decompression sickness needing emergency medical treatment, but which her group leader tried to conceal.* *For ocean cave dives to see sharks, some divers have poor buoyancy control, kick up silt, crash into cave walls, or grab onto sharks, creating danger.*

5. Results: basic coding

5.1. Principal themes

We identified four principal themes from basic coding (Table 4). These apply across all activities, but with different relative importance. The first theme emphasises the primary problem, namely the adverse effects of inadequate client skills, fitness and capabilities. The second shows how it is currently addressed, with tour operators and guides trying to ensure that clients are capable and prepared, but often unsuccessfully. In the third, participants described their own preparations and information sources, and expressed concerns over clients who were poorly prepared. The fourth theme considers the role and importance of site gradings and capability certification programs, for activities where they are available.

5.2. Some clients lack capabilities

Tour operators, guides, and competent clients all expressed concern and frustration over problems created when tourists book adventure tours for which they lack skills and fitness. This applies across all countries, activities, and levels of expertise. Illustrative quotes are listed by activity in Table 5. For brevity, some of these are paraphrased from the original wording in the primary coauthor vignettes. Key issues include: inaccurate marketing that attracts unqualified clients; unprepared clients seeking social capital; failure by clients to declare medical limitations; additional burdens for tour guides and leaders; clients who disobey guide instructions; and compromised safety and satisfaction for the entire group.

5.3. Tour operator responses

Most adventure tour operators take considerable effort to ensure clients are fully informed and appropriately qualified and experienced (Table 6). This includes: information on websites, for specific products; emails and phone calls to clients during pre- and post-booking phases; information on fitness, skill, equipment, and training requirements; and physical tests and training carried out before trips commence.

5.4. Tourist preparation

Individual participants described what steps they took to prepare for adventure tours of various types (Table 7). Since these are drawn from coauthor vignettes, they represent perspectives of responsible tour clients who recognise safety concerns and are keen to maximise their own satisfaction and wellbeing from investments in commercial tourism products. They do not include the perspectives of unprepared clients who experienced difficulties, or were excluded or evacuated from tours they had already booked. Ageing adventure tourists may experience denial of lost capabilities and fear loss of self-esteem (Buckley, 2018). Most adjust to effects of ageing, and appreciate remaining opportunities; but some exhibit entitlement, and expect guides to compensate for their inadequacies (Buckley & Underdahl, 2025).

Table 6
Tour operators' measures to ensure clients possess adequate capabilities.

Activity	Illustrative Quotes
Trekking	*To book on our harder treks, we require prior experience on multi-day full-pack treks. We run assessments to test skills and fitness, give them a training regime, tell them what to bring, and teach them physical and mental toughness.*
Climbing	*Guides check with climbers in advance regarding gender, age, health, fitness, previous climbs, altitude and equipment, and summarise timing, steepness, terrain, nutrition, clothing, and footwear.* *Some climbers good on limestone can't find holds on granite.*
Skiing	*We have magical deep powder, but the terrain is steep, treed, cliffed. We put a lot of effort into minimising avalanche risk and teaching rescue technique.* *Our multi-day Storm Chaser trips in Hokkaido are only for clients confident in deep powder and tight trees, and 5 seasons big-mountain experience. We tell clients they need skills in terrain reading, route selection, navigation through deep snow in forest. We tell them our guides are not ski hosts or instructors.*
Surfing	*Pacific island surf breaks are marketed by international surf tour operators. Once they know skill levels they will contact individual clients directly.*
Diving	*A dive tour operator in Iceland checked our drysuit buoyancy skills, before we visited a geothermal undersea vent in 6° Arctic water.*

Table 7
Tour clients' measures to ensure they possess adequate capabilities.

Activity	Illustrative Quotes
Trekking	*Women are passionate about training, men think they don't need to prepare.*
Climbing	*I trained through skills courses and independent mountaineering trips, before joining high-altitude expeditions with tour operators.* *For sport climbing, I pick an iconic destination and buy a local climbing book. For trad climbing, I ask friends to recommend an IMGF guide. I train in climbing gyms 3–4 times a week, and outdoors once a fortnight.* *Clients can look up guides online to check their reputations and experience.*
Skiing	*We did a week-long self-support winter cross-country ski trip in Yellowstone. Temperatures dropped to -40°. We were well prepared, but still got cold.*
Rafting	*For first descents in Tibet and northwest China in the 1990's, we had only decades-old foreign maps to predict rapids and risks. On one trip we had to bail out, hauling all our gear over a 5000m pass. Now we have detailed satellite imagery, but my own capability has declined.* *For most raft trips, the clients are passengers, and we have rescue kayakers.*
Seakayak	*I took part in a self-supported seakayak tour north of Baffin Island at 72°N, and a boat-support trip north of Svalbard at 81°N. Tour operators provided seakayaks and info on weather, tides, currents, iceberg drift, and polar bear. I had been paddling in the ocean to stay fit, and brought a kayaking drysuit, but some clients were unfit, unskilled, inexperienced, and ill-equipped.* *For seakayak trips in southwestern Alaska, we brought charts and oilskins, and locals gave us tips on bears, glacier calving, dry tree bark to light fires.*
Surfing	*We check YouTube videos, blogs, vlogs, social media posts by recent visitors; and direct word-of-mouth from other surfers. Websites are often misleading.* *My social media feeds advertised surf retreats, emphasising safety, hygiene, mental health and wellness, and additional activities such as yoga. I chose a female-founded surf retreat in Ecuador, because of its strong online presence and its beginner and intermediate as well as expert options.* *I picked Algarve in Portugal as a surf destination because of warm weather, surf schools, and additional attractions for a non-surfing travel companion.*
Sailing	*As crew, you follow the skipper's orders, but you still have to know how to sail. You have to hoist, set, and trim sails, and set a course and steer by it by day or night, in any conditions, even Force 9 in the north Atlantic.*
Diving	*For planning dive trips, Chinese divers use WeChat, Douyin (TikTok China), Kuaishou, and Xiaohongshu (RedNote).*

5.5. Difficulty gradings and capability certifications

Destination- or site-scale degree-of-difficulty gradings, and

Table 8
Role and importance of site gradings and capability certifications.

Activity	Illustrative Quotes
Climbing	*Mountaineering programs in Iran are graded 1–10, and participants register according to ability. There are at least two guides per climb in case of need.* *The Iranian Mountaineering Federation certifies mountain guides in ropework, tools, navigation, meteorology, rescue, and mountain medicine.* *Guidebooks are often outdated, eg. bolts and anchors may be missing.*
Sailing	*Ocean sailing is a big part of tourism in the Algarve in Portugal. Companies offer sail training, certifications, and tours. I completed International Yacht Crew, Marine Communication Master, and Bareboat Skipper courses. Higher tiers are progressive investments in nautical competence.*
Diving	*There is a tiered system of training, certification, and control, by dive shops that refill tanks, and tour operators that demand certificates and logbooks.* *In one group I guided in Papua New Guinea, their certifications were old, and they had lost skills. 60 % had difficulties with safe dive technique.* *Chinese dive resorts accept certifications from PADI, NAUI, and CMAS. Instructors are certified by the General Administration of Sport of China. Chinese regulations require an instructor for every two clients. Clients must pass a theory test and a practical pool test before any open water dives.* *Dive tour operators can now take non-certified dive clients aged 12, even if they can't swim. The medical forms are all self-declared. They carry special high-risk insurance, and the prices are high.*

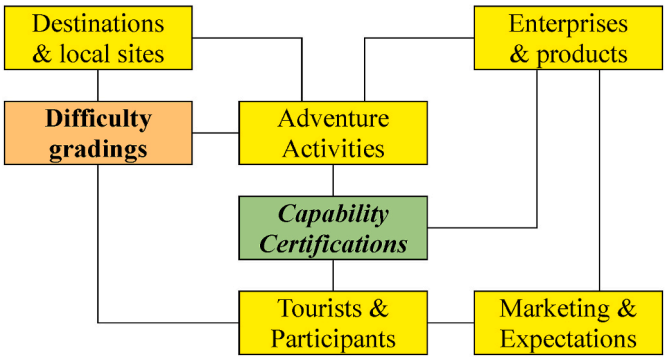

Fig. 1. Axial coding framework: information flows Key: Roman font: standard components of tourism theory. **Bold** font: site degree-of-difficulty grades. ***Bold italic***: participant capability certification.

capability certifications for guides or instructors and individual participants, were mentioned repeatedly by both staff and clients (Table 8), but only for some adventure tourism activities. This reflects differences between activities and countries in degree of risk, degree of regulation, and integration of training programs and qualifications.

6. Analyses: axial coding

Our axial coding model is summarised in Figs. 1 and 2 and Tables 9–11. For adventure tourism activities, information flows between destinations, enterprises, and tourists include site-scale difficulty gradings, and participant capability certifications (Fig. 1). These are novel additions (Table 9). They differ between adventure activities (Tables 10 and 11), and can operate at multiple scales (Fig. 2). Data in Tables 10 and 11 were compiled by the authors from published online information, independently from the vignettes.

Comparing across adventure tourism activities, there are some where sites are graded, some where guides and instructors must be certified, and some where individual practitioners must be certified, but these are not closely correlated. Requirements also differ between countries, depending on social attitudes to risk, history of adventure sport tourism, degree of regulation, insurance and medical funding systems, and accident statistics (Leung et al., 2018; Dinica, 2022). Some adventure activities, such as hiking and trekking, rely on physical coordination learned since childhood. Some, such as surfing, require gradually learned new skills that take practice to acquire, but where risks at beginner level are low. Some, such as diving, are risky even at beginner level, so training is critical. Different activities also adopt certification at different scales or levels (Fig. 2). At present, capability certification requirements are most widespread at the guide/instructor level. These requirements have evolved over time. Regulation, insurance, and liability issues have driven formal professionalisation of guiding, across many adventure tourism activities.

Currently, few outdoor recreation and tourism activities operate formal certification systems for individual clients or participants, with diving and sailing as notable exceptions. For many adventure tourism activities, tour operators attempt to apply informal competency checks, but in the absence of a regulatory framework, clients can and do exaggerate capabilities and conceal infirmities (Buckley & Underdahl, 2025). Some tour group organisers test and train their participants before booking them on tours, but this is unusual. Travel agents routinely book unfit and unskilled clients on inappropriate trips. It seems probable that participant capability certification programs, and corresponding site difficulty gradings, will expand across a wider range of outdoor recreation and tourism activities in the near future.

Table 9
Key aspects of novel components in axial coding framework.

Component	Content and significance
Destination site difficulty gradings	Marketing and management
Enterprise marketing info commercially driven	Generally advertises ideal conditions
Expanded access to autonomous information	Many more sources via internet
Expanded sources eg imagery, vlogs	Not available publicly until recently
Destination capability requirement	What destination demands of clients
Site difficulty gradings provide benchmarks	For destination choice by tourists
Enterprise insurance, landowner liability	Rely on industry practice benchmarks
International gradings useful in marketing	International clients recognise them
Client capability certifications	***Tourist safety & satisfaction***
Participant capability and skill level	What participants can achieve safely
For safety of clients and guides	Group safety depends on individuals
Client satisfaction and enterprise success	Clients want challenge but not danger
Social media sources for satisfaction	No high-skill clients at low-skill sites
Certifications and gradings are for safety	No low-skill clients at high-skill sites
Younger clients unskilled and inexperienced	Urban life histories, no outdoor options
Older clients may be demanding and uncaring	Bucket-list, wealthy, egoist and entitled
Certifications = unbiased information on clients	For booking decisions by enterprises
Clients unknowledgeable or untruthful	Certificates outdated, illnesses omitted

Table 10
Examples of site difficulty gradings by adventure tourism activity.

Activity	Examples of site difficulty grading systems
Hiking and trekking	4 or 5-level walking track grading systems in many countries, based on surface type, steepness, elevation, slipperiness, width, risk, etc
Climbing and mountaineering	Union International des Associations d'Alpinisme; French, Alaskan, Canadian, New Zealand, systems; Yosemite Decimal System, USA and Canada; Ewbank Scale, Australia and New Zealand; Specialist: French Sport, British Trad, Scottish Winter
Skiing and snowboarding	Resort pistes use 4-tier colour codes and advertise % of each; No formal grades outside resorts
River rafting and kayaking	5 or 6-level national & international rapid grading systems, from easy to life threatening; top grade may be subdivided 5.1, 5.2, 5.3
Ocean seakayaking	No formal grades. Difficulty and risk depend on temperature, winds and weather, wave and swell size, camp areas, bears and sharks, navigation
Surfing and kiteboarding	No formal grades. Difficulty and risk depend on temperature, winds and weather, wave and swell size, type of surf break, ides, currents, sharks
Sailing and yachting	No formal grades. Difficulty and risk depend on ocean or lake, latitude, winds and weather, tides and currents, swell and chop, etc

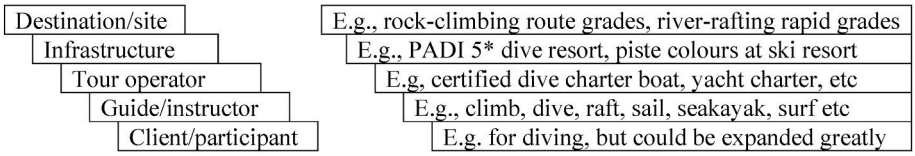

Fig. 2. Adventure tourism site grading and capability certification scales.

Table 11
Examples of guide and participant capability certifications.

Activity	Professional/guide certifications	Participant/client certifications
Hiking, trekking	Union of International Mountain Leader Associations	None. Judged on past experience, trails hiked, general fitness
Climbing, mountaineering	International Federation of Mountain Guides Associations; American Mountain Guides Association; Mountain Training UK & Ireland	None. Judged on grades of routes climbed previously, and general experience and destinations, eg type of rock, type of climbing
Skiing and snowboarding	International Ski Instructors Association; national systems eg in Canada, France, New Zealand, UK	None for resort skiing; judged on experience for backcountry; self-assessed H1-4 for heliski
Rafting and kayaking	International Rafting Federation; American Canoe Association, etc	None. Judged on experience only, rivers and rapids already paddled
Seakayaking	International Sea Kayak Guide Association; national in Australia, New Zealand, Canada, UK, USA	None. Judged on previous seakayak experience and destinations.
Surfing	International Surfing Association; Academy of Surfing Instructors	None. Judged on previous surf experience and destinations
Sailing	Royal Yachting Association; American Sailing Association, International Sailing Federation, International Certificate of Competence (Europe)	
Scuba diving	Professional Association of Diving Instructors; National Association of Underwater Instructors; Scuba Schools International; Confédération Mondiale des Activités Subaquatiques; Technical Diving International	

7. Discussion

7.1. Outdoor recreation and tourism

The outdoor recreation and tourism sector is continuing to grow. Outdoor tourism marketing is aimed increasingly at people with "adventure mindset", but not necessarily prior practical experience. Lifestyle influencers, and public healthcare promotions such as green social prescriptions, encourage people to take part in outdoor recreation, irrespective of outdoor activity skills. This creates risks for individual safety and satisfaction, and costs and liabilities for tour operators, trip leaders, and land managers. More widespread and formalized systems of site and destination difficulty grading and individual participant capability certification, could address these concerns. Historically, these systems expanded in a haphazard fashion. It seems likely that in future, they will become increasingly standardized. Some countries, for example, already screen tourists for high-risk adventure experiences, such as climbing Mt Everest from the Nepal side.

There is a parallel in the regulations adopted applied by park and land management agencies, for visitors and tourism enterprises to engage in outdoor activities. Historically, these were quite *ad hoc*, differing between jurisdictions, agencies and individual parks. More recently, agencies compared and adapted their requirements, to create industry standards that can be used as a defence in any litigation. Destination difficulty gradings and participant capability certifications may follow a similar path. This is already identifiable for some activities. In yachting and sailing, for example, certification requirements have become more widespread and stringent over time. It is also being driven by the emergence of new sport activities, such as hanggliding, wingsuit flying, kiteboarding and speedflying; and perhaps by overlaps between activities such as mountaineering and high-altitude trekking. As outdoor activities such as surfing continue to grow in number of adherents, and training schools and programs proliferate, it seems their courses may gradually be accredited by national government bodies, and their course completion certificates re-cast as competency qualifications.

7.2. Destination choice, marketing and matching

Difficulty gradings and capability certifications contribute most to safety and satisfaction if they are incorporated routinely in destination choice, marketing, and matching processes. Travel agents and trip leaders need to be well informed about both, and enquire from clients or participants about their qualifications, skills, and experience. Currently this applies for special-interest agents who market a small suite of single-activity tours, but not for general-interest agents who will book whatever a client can pay for.

Similarly, search and social media algorithms need an extra step to their marketing match systems, a check on difficulty and capability. Currently, they do not include this, and since they rarely rely on repeat business, they have little or no incentive to develop it. Such a step would hence need government intervention, eg to hold companies owning those algorithms potentially liable, subject to case by case evidence, for any injury due to a mismatch. Any such approach would be difficult to enforce, especially across borders. Failing that, tour clients and operators need to cross-check site difficulty, and individual skills and experience, through direct contact before confirming bookings. This also has obstacles, because of dynamic pricing on booking sites, designed to push impulse buys. Similar quality control issues apply for other online purchases, with approaches that could be adapted to tourism.

7.3. Quality assurance and certification

Quality assurance and certification is a large field, but it focusses on transactions involving material goods, technical competence of professionals and tradespersons, and process standards such as fair trade and ecological impacts of production. There is very little research on the role and value of capability certifications for individuals who are purchasers rather than sellers. Doctors need qualifications, patients do not. Service quality gradings, eg for restaurants, focus only on satisfaction, not on difficulty. Only in competitive sports are difficulty and capability evaluated routinely. There is thus a substantial research opportunity in outdoor recreation and tourism, to analyse: why there are difficulty gradings for some activities and capability certifications for others; why these are designed so differently for different activities; and what their effective economic value may be to each stakeholder.

7.4. Mental health and wellbeing

The benefits of nature-based outdoor recreation and tourism for mental health are now widely recognised. Many countries are making efforts to promote and implement them via public, clinical, lifestyle and workplace healthcare. Outdoor activities are thus being incorporated into healthcare, not only personal leisure. This brings insurance and liability implications for community or commercial providers, and for their trip leaders and tour guides. To comply with those requirements, operators and staff must demonstrate appropriate qualifications. They also need to show that they are offering participants and clients, as patients, therapeutic activities that match their diagnoses and capabilities. Client capability certifications and site difficulty gradings will thus play central roles. Research comparing the effectiveness of self-guided experiences, against the same experiences but with either guides or therapists, is still very limited (Rivieccio et al., 2025). This is now a priority topic.

7.5. Land and park management

If any outdoor recreation participant or tour client becomes injured during their activity, there is always a risk of lawsuits. Individuals seek to recover costs and damages from providers. Providers turn to insurers, who seek recompense from land managers or landowners. Land

management agencies and tour providers include waivers, warranties, and indemnities in commercial operating permits and product bookings, but these are often challenged. Parks agencies also have duties of care to independent visitors, especially where they charge fees and operate booking systems. They therefore have financial interests in checking that visitors and tourists have adequate skills for activities on offer. Certifications provide a potential mechanism. Research is needed to compare the cost of operating such systems, against savings in rescue costs and liability lawsuits.

8. Conclusions

8.1. Principal findings

Increasing numbers of outdoor recreation participants and tour clients lack relevant activity skills. This increases management burdens for guides, and risks and costs for tour companies and land managers. It reduces safety and satisfaction for other clients. It hampers adoption of outdoor recreation and tourism in healthcare. Site difficulty grading and participant capability certification can address these problems, especially if integrated with training and regulation. They are also valuable in marketing and insurance. It is therefore likely that they will expand.

8.2. Limitations

This is a qualitative study, albeit with data from multiple observers, activities, countries, and cultures, over an extended time period. As each observer had different activity preferences, and the various activities were observed in different countries, we analysed data in aggregate. This provides robust results, but did not allow comparisons between places, activities, or observers. This is a novel topic, relevant to several different theoretical frameworks. We therefore focussed on identifying actual trends and patterns in real-life outdoor recreation and tourism, and relating them to each research field separately.

8.3. Future research

Our findings here generate several testable predictions or hypotheses for future research. 1. Destination difficulty gradings and client capability certifications will expand into additional adventure tourism activities. 2. Safety and satisfaction will be highest for clients who assess and adjust their own capabilities before booking. 3. Search and social media algorithms will include screens or checks on client capability, as they do already for other personal factors relevant to sales. 4. Quality certification will expand from professional providers, to include particular classes of purchasers, a novel pattern. 5. Parks agencies will incorporate site difficulty gradings and visitor capability certifications into permit and booking systems.

8.4. Management implications

There are management implications for multiple stakeholders. Satisfaction is reduced if client skill exceeds product requirements; safety is reduced if client skill does not meet those requirements. The greater the risks, the more important that participants have the skills required. Management of underqualified clients depends on location, scale, type, and intensity of the activity. Tour operators and tourists use multiple information sources to match capabilities to destinations. These include certification of infrastructure and guides, and opportunities for training. Many outdoor recreation and tourism enterprises operate in public lands, whose management agencies agencies may also use independent grading and capability certification systems. Site gradings and capability certifications can play a broader role in benchmarking skills, matching destinations, and providing legal backup for guides and enterprises. For destination marketing and management, the match envelope for any activity can be extended either (a) by improving client capability via training, or (b) by reducing destination difficulty via site infrastructure (Fig. 3). Guide skills can compensate for both, but to a limited degree. There are management opportunities to extend site difficulty gradings to new activities, and link client capability certifications to training programs as commercial enterprises.

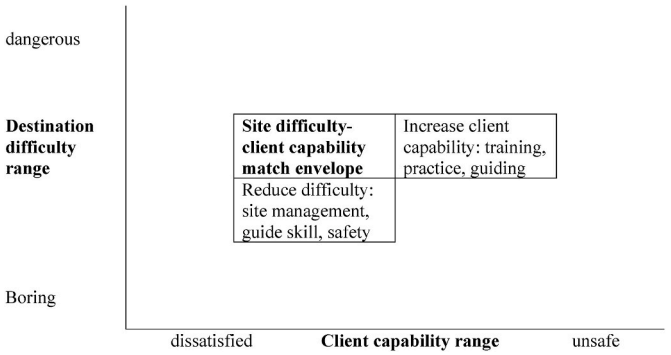

Fig. 3. Managing site difficulty - client capability match envelopes for each activity.

CRediT authorship contribution statement

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Ethical approvals and consents

Not required, all data generated by authors.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data included in article

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