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Original Article

“I never really thought that a virtual ride would be that good!”: Experiences of participants with disabilities in online leisure-time physical activity during COVID-19

Delphine Labbé, Ph. D. ^{a, *}, Namra Desai, BHSc ^b, Cassandra Herman, Ph.D ^a, Chelsea Elder ^c^a Disability and Human Development Department, University of Illinois at Chicago, Chicago, IL, USA^b Faculty of Health Sciences, Queen's University, Kingston, Ontario, Canada^c Adaptive Adventures, National Headquarters, Lakewood, CO, USA

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ABSTRACT

Background: The COVID-19 pandemic has exacerbated the sedentary behavior and inactivity of people, including individuals with disability, who were already less active than their able-bodied counterparts. Therefore, it is particularly important to think about how to maintain and increase their leisure-time physical activity (LTPA). Online adaptive programs may represent a useful tool to do so. However, there is a little research focused on the health impacts of online LTPA.

Objective: This mixed-methods study aimed to explore the experiences of people with disabilities who participated in online adaptive LTPA along with the factors contributing to or limiting participation.

Method: First, semi-structured interviews were conducted with 10 individuals participating in online adaptive LTPA offered by a community organization. Based on these interviews, a survey was developed and completed by 104 participants.

Results: The results of the study suggested that people with disabilities can get a variety of physical and emotional health benefits when participating in adaptive online LTPA, including a strong social benefit. Staff attitude and knowledge as well as the staff's ability to adapt to participant needs played important roles in facilitating participation. Greater access to equipment was needed.

Conclusion: This study offers insights into how online LTPA could support the health-promoting behavior of people with disabilities during the pandemic and beyond.

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Background

The COVID-19 pandemic and the associated physical and social distancing policies have impacted the health of people across the globe. Research has shown increased psychological distress including for people with disabilities,^{1,2} a population that might also be at a higher risk of infection or severe illness due to underlying medical conditions.³ Unfortunately, the pandemic has also exacerbated sedentary behavior and inactivity,^{4,5} especially for people with disabilities, who were already less active than their able-bodied counterparts.^{6,7} Therefore, it is a particularly important moment to promote healthy behaviors, such as leisure-time physical activity (LTPA), for people with disabilities.⁸

It is well documented that LTPA has many health and social participation benefits for people with disabilities (e.g.,^{9,10,11}). LTPA is performed by an individual during time outside of daily living tasks and includes sports participation, exercise, and recreational activities, such as going for a walk, dancing, and gardening.¹² Community-based organizations offer adaptive LTPA programs that create those positive impacts^{13,14} by providing favorable conditions supporting participation, such as specialized equipment and knowledgeable staff.^{10,15} However, social and physical distancing policies have created additional barriers to LTPA that prevent people with disabilities from engaging in in-person programs. A national US survey of individuals with disabilities conducted in 2020 showed that 58% of respondents could not meet their recreation and other health-related activity needs.¹⁶

The use of digital technologies, such as the Internet, could reduce the negative impact of physical distancing on sedentary lifestyles and health.⁸ During the height of the pandemic, most

* Corresponding author. Delphine Labbé, Disability and Human Development, University of Illinois in Chicago 1640 Roosevelt Rd, Chicago, IL, 60608, USA.

E-mail address: dlabbe@uic.edu (D. Labbé).

activities have transitioned to online, and the fitness and sports worlds have followed suit by offering online programs both synchronous and asynchronous.⁴ These online resources mainly targeted able-bodied participants, but a few programs offered online adaptive LTPA to people with disabilities.¹⁷ Beyond their increased salience during the pandemic, online adaptive LTPA programs could offer a means of overcoming traditional barriers to LTPA experienced by people with disabilities,¹⁸ such as transportation, facility accessibility, and cost.^{10,19}

Research on online LTPA²⁰ in the general population was scarce before the pandemic. One of the only studies conducted pre-COVID-19 with families without disabilities suggested that the health benefits of online LTPA were similar to those of in-person programs but varied depending on the context.²¹ Since COVID-19 has forced us to reconsider using digital leisure, few studies have been conducted with people with disabilities or older adults^{22,23,24} One study²² identified physical and emotional health benefits and suggested that online programs may reduce the access barriers associated with in-person LTPA. However, more research is needed to better understand the impact of online LTPA on people with disabilities¹⁷ to inform health promotion efforts with this population. Moreover, these online programs may also have their own challenges such as access to technology or media literacy (i.e., knowledge of digital tools)²³ that need to be further explored.

Aim

The aim of this project was to explore the experiences and impact of online adaptive LTPA for people with various disabilities. Specifically, the project sought to answer the following questions: What are the perceived health and well-being benefits of participating in online LTPA, and how does this experience vary from in-person participation? What are the factors facilitating or limiting participation in online LTPA for people with disabilities? How do people with disabilities perceive the future of adaptive online LTPA?

Method

Design

This was an exploratory sequential multiphase mixed-methods study.²⁵ The first phase was a semi-structured interview followed by a survey (phase 2); both covered the experience of participating in online adaptive LTPA for people with disabilities. The qualitative interviews were used to thoroughly explore the experiences of participants in online LTPA and inform the development of the survey as the literature on the topic was scarce. The quantitative survey allowed for input on these experiences from a larger group of participants. The study was approved by the university research ethics boards (# 2020-1128).

Setting

This study was conducted with adaptive adventures (AA), a community-based organization offering adaptive LTPA for participants with various types of disabilities across the USA. Usually, this organization offered a unique mobile program: they traveled across the USA with trailers filled with adaptive equipment providing LTPA programs (e.g., fitness, cycling, climbing, and water sports) to unserved and underserved areas. At the beginning of the pandemic in the USA (mid-March 2020), AA started offering their activities online using Zoom. They sought to continue offering a variety of programs, such as online cycling, fitness, and yoga, to keep their members with disabilities active, healthy, and engaged. They were

among the first in the USA to shift to online programming and their online program provided a great opportunity to better understand online LTPA for people with disabilities.

Participants and recruitment

The convenience sample included individuals with disabilities participating in the adaptive programs offered by AA. To be eligible for the study, the participants had to be 18 or older, identify as living with a disability, and be past participants in AA's activities either online or in-person. Both for the interviews and the survey, the participants were recruited via email invitation sent by the executive director to its members' list. For the interviews, the interested participants reached out to the director first, who then sent their contact information to the first author. To respect confidentiality, the organization was not informed of who decided to participate in the interviews. An information sheet was sent by email prior to the interviews, and the participants were able to ask questions to the researcher before starting the interview. An oral informed consent was obtained at the beginning of the interview. A link to the survey was included as part of the email sent by the executive director to the members' list. Consent for the survey was provided electronically: participants had to read the electronic consent form and click on "continue the survey" if they agreed to participate.

Data collection and analysis

Phase 1 - semi-structured interview

The semi-structured interviews were conducted by the first author in August and September 2020 during which COVID-19 restrictions were still in place in most states in the USA. The interviews focused on the individual's need and experience with online adaptive LTPA programming including its impact on their health. The interviewer also explored participants' perceptions on the differences between the online and in-person activities, factors that limited or supported their participation, possible improvements, and their potential future participation in online adaptive LTPA (see guide in supplemental materials). The interviews were conducted via Zoom, were audio and video recorded, and lasted approximately 1 h on average. Only the audio was used for the transcription.

The interviewer was a female researcher, with expertise in adaptive leisure and qualitative interviewing, who identified as able-bodied. She presented herself both as a volunteer in adaptive leisure and as a researcher interested in understanding their experiences. She did not have the previous contact with the participants. The participants were assured that their interview data would not be available to the organization, and that only anonymized and clustered results would be shared.

All the interviews were transcribed verbatim and analyzed using an inductive content analysis.²⁶ First, the interviews were coded inductively by the first and second authors independently, followed by discussion between the two coders to reach consensus. Then, all the codes were reviewed for redundancy and coherence to create a final list of codes. The final codes were reapplied to the entire set of interviews. Those codes were then used to develop the survey items. For instance, items related to perceived physical, psychological, and social benefits of participating in online activities (Table 2) and barriers and facilitators to participation (Tables 4–6) were included in the survey based on the codes identified during the interview phase.

Phase 2 - Survey

The survey included closed and open-ended questions on participation in online LTPA (provided in supplemental materials).

As indicated, the items were created based on the interviews and complemented by the literature on adaptive LTPA as knowledge on online LTPA was limited. The survey also included the validated *Measure of Experiential Aspects of Participation*²⁷ (MEAP) (Table 3) which comprised 12 items to assess the six dimensions of quality of participation in LTPA: autonomy, belongingness, challenge, mastery, engagement, and meaning. Items in the survey also addressed the future of online LTPA programs. The survey included questions for people who participated, who stopped participating, or who never participated in the online activities to have a wider range of perspectives. Those who participated in online activities completed all survey questions. Those who stopped participating or never participated were asked to complete a subset of questions, including reasons to stop participating, barriers to participation (Table 5), support needed to participate (Table 6), and the future of online LTPA. The survey was pre-tested by the last author, as the executive director of XYZ. The survey was first distributed in December 2020, and then two follow-up reminders were sent two weeks apart in January 2021.

Descriptive analyses were conducted to characterize the overall trends in the surveys' answers. To identify common patterns in the participants' experiences, the survey open-ended questions were analyzed using the same codes as for the interviews. New codes were added when needed.

Both the interviews and the survey included demographic and online LTPA-related questions, including age, primary language, gender, type of impairment, education, employment status, activities involvement, and years of participation in adaptive LTPA.

Findings

Participants

We interviewed 10 participants with disabilities and 104 completed the survey. Table 1 presents the characteristics of the participants for both data collection methods.

The interview participants were half male. The majority were older than 40 years old, had a bachelor's degree, and were retired or at home. Less than half were veterans. They lived with a variety of disabilities and most of them used assistive technology daily. The interviewees participated in at least two online activities, weekly. Two of the interviewees had stopped participating in online LTPA because of changes in their physical condition.

The survey respondents were a majority male, aged between 40 and 79, with some college or a bachelor's degree, retired or at home, living with a variety of physical, cognitive, and emotional impairments, and used assistive technology, especially mobility aids, such as manual wheelchairs. Half were veterans. Among the 104 survey respondents, 50 (47.6%) were participating in the online activities, 18 (17.1%) had stopped participating, and 36 (34.3%) had never participated. More than half of the survey respondents (58.0%) joined the online activities weekly. Among those who stopped participating or never participated (n = 54), the reasons mainly given were lack of interest in online activity (27.8%) and others (24.1%), e.g., not being aware of the activities, doing activities outdoors, and availability.

What are the benefits of participating in online LTPA?

The survey results are presented in combination with the interview findings to provide a more nuanced and comprehensive account of the participant's experiences with online adaptive LTPA. Anonymized quotes are used to illustrate their perceptions.

Table 1

Participants and participation in LTPA characteristics for the interview and the survey.

Characteristics	Interview (n = 10) n (%)	Survey (n = 104) n (%)
Demographics		
Gender		
Female	5 (50.0)	42 (40.0)
Male	5 (50.0)	59 (56.2)
Gender variant/non-conforming	0 (0.0)	1 (1.0)
Prefer not to answer	0 (0.0)	2 (1.9)
Age		
Under 18	0 (0.0)	1 (1.0)
18–29	2 (20.0)	1 (1.0)
30–39	1 (10.0)	13 (12.4)
40–59	5 (50.0)	55 (52.4)
60–79	1 (10.0)	34 (32.4)
80 or older	1 (10.0)	0 (0.0)
Primary language		
English	8 (80.0)	93 (88.6)
Spanish	1 (10.0)	11 (10.5)
Others	1 (10.0)	0 (0.0)
Education		
Less than high school	0 (0.0)	1 (1.0)
High school graduate	1 (10.0)	7 (6.7)
Some college	0 (0.0)	23 (21.9)
Bachelor's degree or technical diploma	9 (90.0)	43 (41.0)
Professional degree	0 (0.0)	7 (6.7)
Graduate degree (master, Ph.D.)	0 (0.0)	23 (21.9)
Main occupation		
Employed full time	1 (10.0)	18 (17.1)
Employed part time	2 (20.0)	7 (6.7)
Retired or at home	7 (70.0)	75 (71.4)
Student	0 (0.0)	4 (3.8)
Veterans	4 (40.0)	53 (50.5%)
Primary Condition^a		
Spinal cord injury	2 (20.0)	23 (21.9)
Stroke	0 (0.0)	4 (3.8)
Parkinson's disease	0 (0.0)	1 (1.0)
Multiple sclerosis	1 (10.0)	5 (4.8)
Amputation	1 (10.0)	20 (19.0)
Arthritis	0 (0.0)	3 (2.9)
Post-traumatic stress disorder	1 (10.0)	17 (16.2)
Traumatic brain injury	1 (10.0)	12 (11.4)
Muscular dystrophy	1 (10.0)	3 (2.9)
Low vision/blindness	0 (0.0)	4 (3.8)
Anxiety or depression	0 (0.0)	6 (5.7)
Other	7 (70.0)	9 (8.6)
Assistive technology daily use		
Yes	7 (70.0)	68 (64.8)
Type of device used^a		
Prosthesis or orthosis	0 (0.0)	29 (42.6)
Cane (s)	3 (42.9)	20 (29.4)
Crutches	2 (28.6)	14 (20.6)
Walker	1 (14.3)	17 (25.0)
Manual wheelchair	4 (57.1)	31 (45.6)
Power wheelchair	1 (14.3)	11 (16.2)
Scooter	1 (14.3)	5 (7.4)
White cane	0 (0.0)	3 (4.4)
Service dog	0 (0.0)	9 (13.2)
Communication board	0 (0.0)	1 (1.5)
Other	4 (57.1)	6 (8.8)
Participation in virtual LTPA Involvement in the activities		
Participated	8 (80.0)	50
Stop participating	2 (20.0)	18 (17.1)

(continued on next page)

Table 1 (continued)

Characteristics	Interview (n = 10) n (%)	Survey (n = 104) n (%)
Frequency of participation		
Never participated	0	36 (34.3)
n = 10		n = 60^b
Weekly	10 (100.0)	29 (48.3)
Monthly		8 (13.3)
A few times a year		13 (21.7)
Only once		1 (1.7)
Reasons to stop participating or never participated	n = 2	n = 54^c
Lack of interest	—	15 (27.8)
Health or physical conditions	2 (20.0)	9 (16.7)
Difficult access to activity equipment	—	9 (16.7)
Lack of electronic equipment or internet connection	—	6 (11.1)
I wanted to try something else or something new	—	7 (13.0)
I didn't have time anymore	—	2 (3.7)
The activity was not offered anymore.	—	1 (1.9)
Other, specify	—	13 (24.1)

^a Participants could select more than one option.

^b For those who participated or stop participating, with missing data for this question.

^c Those who stop participating or never participated.

What were the perceived benefits of online LTPA and how does this experience vary from in-person participation?

The benefits of online LTPA identified by the participants vary. We grouped them under three subthemes for the sake of presentation: Staying Active and Improving Physical Health; Community and Connections; and Improving Mental Health for Holistic Well-being. Among the list of 16 potential benefits in the survey (see Table 2), the respondents (n = 50) checked on average eight perceived benefits of online adaptive LTPA.

Table 2

Benefits of virtual adaptive LTPA from the survey by themes (n = 50).

Questions ^a	n (%)
Staying Active and Improving Physical Health	
It allows me to continue doing an activity I enjoy	41 (82.0)
I got stronger physically (e.g. muscle strengths, stamina)	32 (64.0)
I learn new things	25 (50.0)
I accept my disability better	20 (40.0)
I can set my own goal	19 (38.0)
I started new activities	16 (32.0)
I lost weight	12 (24.0)
Community and Connections	
I feel less isolated	33 (66.0)
I interact with nice people	33 (66.0)
I meet new people	24 (48.0)
Maintaining and Improving Mental Health	
It helps me get through the pandemic	33 (66.0)
It gives me something to look forward	31 (62.0)
I feel energized	27 (54.0)
I feel more relaxed	27 (54.0)
I feel like my needs are being fulfilled	23 (46.0)
I feel less depressed	22 (44.0)

^a Respondents could check all the benefits that applied.

Staying Active and Improving Physical Health. During the interviews, the participants mentioned how they made gains or maintain their physical health which included improving their strength, endurance, and losing weight. They also reported that it helped them stay active and continue previous activities or start new ones. One participant said: "I try to do it two days a week. And I just really enjoy it. It keeps me going. [...] I usually have different physical therapy, but I don't have that right now [...] I've actually seen a huge improvement in my body." Two interviewees also talked about how online LTPA helped them manage or reduce their pain and recover from injury. Some participants also talked about how it helped them accept or manage their disabilities. Participants also discussed learning new things about physical activity (i.e., adaptations for exercises) and healthy behaviors, such as eating habits.

The benefit identified by most survey respondents was that the online activities allow them to continue activities that they enjoyed (82.0%). A majority of respondents (64.0%) also indicated that they saw improvement in their physical condition, such as having more strength or energy, and half of respondents (50%) identified learning new things as a benefit.

Community and Connections. In the interviews, the participants explained how the online LTPA provided them with a feeling of community and how it helped them battle social isolation. One interviewee expressed it this way: "Because so much of the time we feel like we're left behind. I feel like I'm left behind. So being included, even if it's included in a way that is not in person is really ... I don't know. I find it very powerful." Interviewees also explained that it allowed them to interact with people they knew and to make new contacts, sometimes with individuals living outside of their localities or their states, which was not possible with in-person activities. As one participant said "[...] I mean, they have people I think from, [name of city] and a couple other places who can join in too. So in a way you kind of expand the community even as its limited..." Some also viewed the other participants as a source of motivation, offering a kind of social accountability. In the survey, two benefits were reported by an equally large proportion of survey respondents (66.0%): feeling less isolated and interacting with nice people (Table 2). In one open-ended question, almost half of the survey respondents identified that connecting with others and building strong relationships with the staff were benefits of online LTPA.

Maintaining and Improving Mental Health. The interviewees shared how the online activities supported their mental and emotional health, including helping them manage issues they were already dealing with, such as PTSD or depression. They also said how it lifted their moods and gave them positive emotions. One interviewee shared an emotional story about how the online LTPA supported her throughout personal events that happened during the pandemic: "And honestly, without the online with AA, I don't know what I would have done. After losing my [family member], it was just ... And having the online training to go to after my [family member] death, it was a blessing." The participants also felt they increased their alertness and concentration and reported how they just enjoyed the online activities.

In the survey, the mental health benefits reported by most participants were that the online LTPA helped them get through the pandemic (66.0%) and give them something to look forward to (62.0%). More than half of the survey respondents (54.0%) also indicated that they felt energized and more relaxed after engaging in the activities.

Dimensions of *quality of participation* were also identified as benefits of engaging in online LTPA. The interviewees talked about the benefits of being able to set their own goal, such as choosing the activity intensity, which is associated with the dimension of autonomy. Similarly, the survey respondents strongly agreed the most with the items of the MEAP related to autonomy (see Table 3): I feel

Table 3
Responses to the measure of experiential Aspects of Participation (n = 50).

Items	n (%)	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
When engaging in adaptive online activities, I feel ...	QPPF ^a dimension							
I do what is desirable for me	Autonomy	0	0	0	1 (2)	2 (3.9)	14 (27.5)	34 (66.7)
Free to make my own choices	Autonomy	0	0	0	0	4 (7.8)	11 (21.6)	36 (70.6)
I fit in	Belongingness	0	0	1 (2)	1 (2)	7 (13.7)	15 (29.4)	27 (52.9)
Accepted by others	Belongingness	0	0	2 (3.9)	3 (5.9)	2 (3.9)	11 (21.6)	33 (64.7)
My skills match the level of difficulty of the activity	Challenge	0	1 (2)	1 (2)	4 (7.8)	8 (15.7)	17 (33.3)	20 (39.2)
I get just the right amount of challenge	Challenge	0	0	4 (7.8)	2 (3.9)	5 (9.8)	17 (33.3)	23 (45.1)
Entirely focused on what I am doing	Engagement	0	2 (3.9)	0	3 (5.9)	8 (15.7)	15 (29.4)	23 (45.1)
That time passes very quickly	Engagement	1 (2)	0	0	3 (5.9)	4 (7.8)	23 (45.1)	20 (39.2)
I can achieve my goals	Mastery	1 (2)	0	2 (3.9)	3 (5.9)	5 (9.8)	22 (43.1)	18 (35.3)
Confident in my skills/abilities	Mastery	0	1 (2)	1 (2)	1 (2)	5 (9.8)	19 (37.3)	24 (47.1)
A sense of purpose	Meaning	0	0	0	5 (9.8)	6 (11.8)	14 (27.5)	26 (51.0)
A sense of responsibility to others	Meaning	0	3 (5.9)	0	14 (27.5)	8 (15.7)	13 (25.5)	13 (25.5)

^a Quality of participation in Parasports Framework.

Table 4
Perceptions of facilitators of adaptive virtual LTPA by participants with disabilities (n = 50).

	n (%)			
Facilitators	Not at all facilitating	Slightly facilitating	Moderately facilitating	Extremely facilitating
The attitude of the staff (e.g., they are encouraging, they are friendly, etc)	0 (0.0)	0 (0.0)	4 (8.0)	46 (92.0)
The knowledge of the staff	0 (0.0)	2 (4.0)	4 (8.0)	44 (88.0)
The staff adapts the activity to the capacity of the participants	0 (0.0)	1 (2.0)	7 (14.0)	42 (84.0)
The staff uses objects that I can found in my home to do the activity	0 (0.0)	2 (4.0)	6 (12.0)	42 (84.0)
"The activity focuses on my strengths and my abilities."	0 (0.0)	1 (2.0)	10 (20.0)	39 (78.0)
I can do the activity from my home	1 (2.0)	1 (2.0)	9 (18.0)	39 (78.0)
The activities are free	1 (2.0)	1 (2.0)	10 (20.0)	38 (76.0)
There is a variety of activities offered both in terms of sports and levels (e.g., low vs. high intensity)	1 (2.0)	2 (4.0)	13 (26.0)	34 (68.0)
The activities are offered on different days of the week	0 (0.0)	2 (4.0)	16 (32.0)	32 (64.0)
The registration process	1 (2.0)	2 (4.0)	14 (28.0)	32 (64.0)
The activities are live	1 (2.0)	6 (12.0)	13 (26.0)	29 (58.0)
Adaptative adventures provided me with some equipment.	8 (16.0)	2 (4.0)	11 (22.0)	28 (56.0)
There is a level of accountability	3 (6.0)	10 (20.0)	10 (20.0)	25 (50.0)
The recordings of the activity are available online afterward.	4 (8.0)	6 (12.0)	23 (46.0)	17 (34.0)

Table 5
Perceptions of barriers of adaptive virtual LTPA (n = 68).

	n (%)			
Barriers	Not at all limiting	Slightly limiting	Moderately limiting	Extremely limiting
Acceptance of my disability	36 (52.9)	18 (26.5)	11 (16.2)	2 (2.9)
My physical condition or health	36 (52.9)	22 (32.4)	7 (10.3)	2 (2.9)
My mental health	48 (70.6)	12 (17.6)	8 (11.8)	0 (0.0)
The other participants	51 (75.0)	8 (11.8)	6 (8.8)	2 (2.9)
My internet access	49 (72.1)	13 (19.1)	4 (5.9)	1 (1.5)
The fact that the activity is live	61 (89.7)	4 (5.9)	2 (2.9)	0 (0.0)

Table 6
Support needed to participate (n = 104).

Support	n (%)
<i>Needed</i>	
Yes	49 (46.7)
No	47 (44.8)
No answer	9 (8.6)
<i>Type of support needed (open question)</i>	n = 49
Equipment (e.g., trainer, specialized)	14 (28.6)
Expended scheduling (e.g., activities in evening)	4 (8.2)
Technological support (e.g., internet, cell phone, etc.)	7 (14.3)
Improved communication on activity offered and registration, including reminders	6 (12.2)
Changes in virtual programming (asynchronous video, a different type of platform, and other types of activity)	6 (10.4)

free to make my own choices (72.0%) and I feel I do what is desirable for me (68.0%). A majority of survey respondents also strongly agreed (66.0%) that they felt accepted by others.

What are the factors impacting participation in online adaptive LTPA?

When asked about the factors facilitating their participation in online LTPA, the interviewees talked mostly about the staff, aspects of convenience, and the resources provided. They found that the staff was welcoming and made everyone feel recognized, and they provided encouragement and positive feedback, offered the right amount of challenge, and individualized the activity to the participant needs. The interviewees appreciated the consistent and frequent scheduling and felt the way the activity was offered was convenient (e.g., scheduling process, recordings, and number of staff). Doing the activity at home was also helpful as it meant less preparation. One participant said *"It helps fit in with the schedule a lot. I mean, you can schedule around it and, you know, you're at home so you don't have to go somewhere. You've got ... I've set up equipment and things so that I can do stuff at home, so it's easy that way."* The variety of activities both in terms of type and intensity, the access to equipment through grants or donations by the organization, and the free cost were also seen as facilitators.

In the survey, of the 14 facilitators listed (see Table 4), all but two were judged as extremely facilitating by more than half the respondents. Those related to the staff were selected by the most respondents: the staff attitude (92.0%); the staff knowledge (88.0%); the staff adaptation of the activity (84.0%); and how the staff uses objects that could be found at home (84%). In an open-ended question about factors supporting participation, one survey respondent wrote: *"The coaching is a big help in making the adjustments I need to make for my disability."*

In the interviews, almost all participants talked about how access to technology, such as the internet, could be a barrier for participating. Some also felt that online activities did not allow for as much socializing as in-person activities, for instance, they missed individual connection.

Survey respondents who participated or stopped participating (n = 68) were asked about barriers to participation (see Table 5). Most of the factors were judged as not limiting at all by more than 70% of the respondents. Two barriers, acceptance of my disability and my physical condition, were identified as slightly or moderately limiting by a little less than half of the respondents (43.7% and 42.7%, respectively).

When asked about additional support that would be needed for online LTPA, the interviewees spoke mostly about equipment and communication about the activities. One participant suggested support to maintain the equipment *"The equipment, and also the*

equipment maintenance is a challenge. [...] I would do equipment maintenance before and after sessions so that if ... Or if something happens with the bike during a session, then there would be a volunteer that would be helping

All the survey respondents (n = 104) were asked about the support needed to participate in online adaptive LTPA (Table 6). A little less than half (46.7%) reported needing support. The type of support most needed was having adaptive equipment at home (28.6%).

What is the future of virtual adaptive LTPA?

Finally, participants were asked about the future of adaptive online LTPA beyond the pandemic. The interviewees were all interested in hybrid programming that would combine online and in-person activities. They felt that hybrid was the best format for people with disabilities, as it offers more variety and choices, provides flexibility if they cannot participate in-person, and would be great in winter or during inclement weather.

All survey respondents (n = 104) were first asked about the future of online LTPA. More than half of them (55.5%) responded that they would participate in a hybrid program. The main reasons to participate in a hybrid program were the location of the activity (35.0%), the schedule (25.0%), the type of activities offered (21.3%), as well as the weather and the season (17.5%).

Discussion

This study looked at the experiences of people with disabilities participating in online adaptive LTPA during the COVID-19 pandemic offered in the community to a wide range of people. It is one of the first studies to look at the health benefits, the differences with in-person activities, and the factors affecting participation.

Overall, our findings revealed that engaging in online LTPA was overall a positive experience for the participants with disabilities. It allowed them to stay active, despite the social and physical distancing restrictions. In addition, those who participated identified a variety of mental and physical health benefits, including helping to manage the impact of the pandemic itself. For the participants, the online program offered by AA represented a constant in an unstable pandemic world, which has been suggested by the United Nations²⁸ as an efficient way to deal with stress and restlessness. However, a certain proportion of participants did not participate or stopped participating in the online programming due to a lack of interest or being limited by physical conditions. Füzeki et al.²³ also reported that people were attracted to online exercises differently depending on their physical activity habits and other individual characteristics, such as their age or weight. It may mean that additional motivational support would be needed to reach certain subgroups of people with disabilities and encourage them to participate in online LTPA.

Key benefits identified in our study were the ability to stay connected, break the isolation, and belong to a community. It was even perceived as an advantage of the online LTPA over in-person. These findings reaffirm the large social component of LTPA for people with disabilities, which has been increasingly highlighted in the literature.^{10,29,30} Moreover, they suggest that it is possible to achieve this social benefit through online programming if the activities are designed in a way that allows interactions. Indeed, the AA programs were offered live and had a built-in "social moment" which may have contributed to increase in the social benefits. A recent research study²³ focusing on asynchronous online exercise classes reported that over 60% of the users missed the interaction with others and, as a result, lost their motivation to exercise. An

additional social benefit of online LTPA identified in this study was the fact that they allowed participants with disabilities to connect with people beyond their own local community, which was an advantage also reported by Blauwet et al.²² However, AA have already a national reach allowing them to offer their programs to a wide audience. This might not be possible for more local or smaller organizations.

Our findings also stressed the central role of the staff in facilitating the experiences of people with disabilities in adaptive online LTPA, which has been emphasized for in-person LTPA.^{31,32} The main facilitators were the staff's attitude and knowledge, and the adaptations made to fit the participants' needs. Personal feedback and live interactions with the instructors were also important factors reported by Schwartz et al.²⁴ in their online LTPA program with older adults. Individual guidance was also something that participants in asynchronous online exercise programs were particularly missing.²³ Encouragement and positive support have been shown to increase the feeling of competence and motivation to do physical activity³³; therefore, they are important to maintain engagement in online LTPA. The participants in our study also perceived they were offered the space to set their own goals and make their own choices. Strategies promoting independence have been identified as impacting motivation to do physical activity for people with disabilities.¹⁵

People with disabilities are a minority group that still experience a high level of isolation³⁴ due to different environmental barriers. Therefore, access to adaptive online LTPA could improve inclusivity within these communities and alleviate some of the isolation faced by people with disabilities. However, we must be careful not to rely only on these online opportunities, which could keep people with disabilities "behind closed doors." Envisioning online LTPA as part of a hybrid programming could be one way to provide opportunities for people with disabilities to be visible and active members of their communities.^{10,35} The participants in this study were generally interested in participating in hybrid programs, especially to take part in activities that may be far from their home or do not align with their schedules. However, offering hybrid programs could represent challenges in terms of resources and procedures for community organizations. More research would be needed to understand how to successfully implement those programs and how to better support organizations accordingly.

This study has some limitations. Despite AA offering activities to a large population living with disabilities across the USA, this study still focused on only one organization. More studies are needed with a larger selection of organizations. Also, although the participants had varying impairments, the majority were living with physical limitations which is consistent with the mission of AA. They might have focus on some aspects that would have been different for individuals with intellectual and developmental disabilities (IDD) for instance Ref. 22. Moreover, the participants were mostly educated and retired veterans who might have access to more resources, such as technology and equipment, needed to participate in online LTPA.³⁶

Conclusion

This study highlighted the positive impact of online LTPA for the health and well-being of people with disabilities during the COVID-19 pandemic. The participants explained how it allowed them to stay active and deal with the consequences of the pandemic, especially by reducing social isolation and providing an outlet for connecting with others. Several strategies related to the way the program was offered facilitated engagement, especially the staff, the schedule, and the home delivery. The study findings are important as the pandemic promises to have permanently shifted

life in the USA and the world, such that online LTPA programs will likely be of much greater importance than they were previously. It is thus central to ensure that people with disabilities are included in those various opportunities to be physically active.

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Appendix A. Supplementary data

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