The New, COVID-Driven Outdoor Recreationists in the U.S.: Who They Are, Who They Aren't, and Who Will Stay Involved

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As the COVID-19 pandemic spread across the United States, many residents began participating in outdoor recreation for the first time, or returned to outdoor recreation after a prolonged hiatus. During the first year of the pandemic, many parks in the U.S. experienced record visitation as overall park and protected area visitation increased across much of the country. Part of this increase in visitation was likely the result of existing outdoor recreationists who increased their participation during the first year of the pandemic because of restrictions to other types of leisure activities. However, it is possible that much of the increase in outdoor recreation and park use was the result of a recreation substitution, as new outdoor recreationists either tried outdoor recreation for the first time or returned to outdoor recreation because they could not do their more preferred means of recreational activities (e.g., go to bars, movies, gyms, etc.). Research concerning these new participants is sparse at present (Grima et al., 2020; Outdoor Industry Association & Naxion Research Consulting, 2021). Therefore, the research detailed in this report focuses on the results of a national panel study aimed at gaining a more robust understanding of both 1) how these new outdoor recreationists differ from other participants and non-participants and 2) the behaviors of these new outdoor recreationists. In doing so, we provide insights concerning information used by new participants to aid their transition to outdoor recreation, how helpful this information was, what activities they participated in, where they participated in these activities, and if they plan to continue participating once the pandemic is over.

Demographic information regarding activity-based clusters of new outdoor recreationists is depicted in Appendix A.

Please note that not all respondents answered all questions.

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Research Questions

The goals of this research were twofold. First, we sought to better understand differences between the following unique groups: 1) those who did not participate in outdoor recreation prior to the pandemic and did not participate during the pandemic, 2) those who did participate in outdoor recreation prior to the pandemic and continued to participate during the pandemic, 3) those who did participate in outdoor recreation prior to the pandemic but stopped participating during the pandemic, and 4) those who did not participate in outdoor recreation prior to the pandemic but started to participate during the pandemic. Second, we wanted to better understand this last group—the new outdoor recreationists (beginning participation since the start of the COVID-19 pandemic)—including the information they used to begin engaging in outdoor recreation, how helpful this information was, what activities they participated in, where they participated in outdoor recreation, and if they plan to continue participating once the pandemic is over.

Thus, the following research questions were assessed:

1. What differences exist between participant groups?
2. Where are these new participants going for outdoor recreation most often?
3. What activities are these new outdoor recreationists doing most often?
4. What clusters—based on activity types— exist among new outdoor recreationists?
5. Why did these new participants get involved in outdoor recreation?
6. What sources were most used by new participants to find information about outdoor recreation?
7. What were the most helpful factors in aiding people's transition to outdoor recreation during the pandemic?
8. How will new outdoor recreationists' participation change after the pandemic?
9. How do perceived post-pandemic substitution behaviors vary across types of new outdoor recreationists?

Methods

Data Collection and Cleaning

Data were collected from a paid Qualtrics panel (see Qualtrics ESOMAR – www.esomar.org), targeting all four regions of the U.S., including the Northeast, South, Midwest, and West. While much of the focus of this study centered on studying new participation in outdoor recreation driven by the pandemic, our initial screening questions also allowed us to determine who is, who is not, and who was but is no longer an outdoor recreationist during the pandemic. Data were collected from eligible respondents (adults age 18 or older within these four geographic regions) while filtering respondents into these categories through an initial screening and basic demographic questions, until a sample of $n=1000$ new outdoor recreationists were collected across the nation. Therefore, these data were not purposefully controlled to match the U.S. census, but rather were allowed to be collected in a manner that represents the U.S. geographically, based on outdoor recreation participation prior to and during the pandemic. This allowed us to determine who these individuals are, rather than place census parameters in which

demographics may not match these outdoor recreationists groups. Online panel sampling is both highly cost and time effective compared to other survey distribution methodologies (Gosling et al., 2014), without sacrificing data quality (Roulin, 2015). Numerous peer-reviewed studies in outdoor recreation have utilized Qualtrics for this purpose (e.g., Landry et al., 2021; McDougall et al., 2020; Pitas et al., 2019).

The survey was launched on May 10th, 2021 and the final survey was completed on June 13th, 2021. Selected respondents were screened using a question inquiring whether they were “new or returning to frequent outdoor recreation since the COVID-19 pandemic began.” This was defined for respondents as “someone who has started pursuing activities undertaken for recreation in nature-based environments that generally involve some level of intentional physical exertion, at least ONCE PER MONTH since March 2020, when the COVID-19 pandemic began.” The definition of outdoor recreation was derived from the U.S. Bureau of Economic Analysis’s definition: “All recreational activities undertaken for pleasure that generally involve some level of intentional physical exertion and occur in nature-based environments outdoors” (Highfill et al., 2018, p. 4). A list of qualifying outdoor recreation activities was also provided (see items in Table 3). Qualifying outdoor recreation activities were derived from the Outdoor Industry Association (Outdoor Foundation, 2020) and the U.S. Bureau of Economic Analysis (Highfill et al., 2018). Respondents indicating that they were new outdoor recreationists since the start of the COVID-19 pandemic were asked to complete the full survey.

Qualtrics conducted ongoing data cleaning throughout response collection to ensure the sample was collecting valid responses. Two binary questions asking about the same behaviors were placed at different points in the survey to ensure identical responses. When identical responses were not recorded, the survey was removed from the dataset. Further cleaning measures ensured that respondents were not “straight-lining” (answering the same response to each question).

Measurement of Participant Type

Four different participant groups were identified in the first section of the survey (see Table i). They included: 1) those who did not participate in outdoor recreation prior to the pandemic and did not participate during the pandemic (No → No), 2) those who did participate in outdoor recreation prior to the pandemic and continued to participate during the pandemic (Yes → Yes), 3) those who did participate in outdoor recreation prior to the pandemic but stopped participating during the pandemic (Yes → No), and 4) those who those who did not participate in outdoor recreation prior to the pandemic but started to participate during the pandemic (No → Yes). This last group (No → Yes) received follow-up questions regarding their participation in outdoor recreation during the pandemic and perceived future participation.

Table i: Defining Participant Type

	Participant Group			
	Non-Outdoor Recreationist	Existing Outdoor Recreationist	Previous, But No Longer Outdoor Recreationist	New Outdoor Recreationist
Participated in outdoor recreation regularly <i>prior to</i> the pandemic?	No	Yes	Yes	No
Participated in outdoor recreation regularly <i>during</i> the pandemic?	No	Yes	No	Yes

Measurement of Activity Type

Respondents falling into the No → Yes group (see above) were asked how often they participated in an array of 22 outdoor recreation activities since March 2020. Rate of participation was measured on a scale, including: 0 = Never, 1 = Less than once a month, 2 = Once or twice per month, 3 = Once per week, 4 = Two or three times per week, 5 = Daily or almost daily, 6 = Several times per day. These intervals were taken from Degenhardt et al. (2011).

Measurement of Substitution Behaviors

Respondents were also asked about their perceived future substitution of outdoor recreation activities following the conclusion of the COVID-19 pandemic. Four substitution behaviors were derived from Dawson et al. (2011) and Orr and Schneider (2018), including: replacing some of their outdoor recreation activities with non-outdoor recreation activities, replacing their outdoor recreation activities with different outdoor recreation activities, travelling further to participate in outdoor recreation, and completely stopping participation in outdoor recreation. Each substitution behavior was measured on a five-point scale, including: -2 = strongly disagree, -1 = somewhat disagree, 0 = neither agree nor disagree, 1 = somewhat agree, 2 = strongly agree (Dawson et al., 2011).

Cluster Analysis

Cluster analysis was used to establish distinct groups of respondents based on activity type. In recreation and leisure research, cluster analysis is a useful means of distinguishing subgroups of visitors, recreationists, and tourists based on their behaviors, attitudes, or any number of attributes (Vaske & Sponarski, 2019). As often noted in discussions of cluster analysis, it “becomes as much an art as a science to identify a cluster solution that best differentiates these subgroups” (Weaver & Lawton, 2011, p. 338). As noted by Vaske and Sponarski (2019), “There is no wrong or right answer of the appropriate number of clusters. It depends on the researcher’s judgement regarding what constitutes similarity” (p. 648).

Cluster analysis based on activity type followed the methods of Derek et al. (2019) for establishing clusters constructed on tourists’ activities. However, unlike Derek et al. (2019), we used a combined hierarchical and *k*-means clustering approach, as advocated by Mooi and Sarstedt (2011). This combined approach allows researchers to take advantage of the ability to gain a data-driven number of clusters through hierarchical cluster analysis and then pre-define that specified number of clusters in a *k*-means cluster analysis, which offers superior performance with samples larger than 500 respondents and when many variables are present. This approach is also less affected by outliers (Mooi & Sarstedt, 2011).

Prior to cluster analysis, correlation coefficients were measured for all activities, with coefficients greater than .90 considered unacceptable (Mooi & Sarstedt, 2011). This first step used Ward's method for hierarchical cluster analysis. Ward's method is based on the means of all included variables and then, for each respondent, the squared Euclidean distance to the cluster mean is tabulated and these distances are totaled (Mooi & Sarstedt, 2011; Norusis, 2012). "At each step, the two clusters that merge are those that result in the smallest increase in the overall sum of the squared within-cluster distances" (Norusis, 2012, p. 388). This process creates a tree-like structure known as a dendrogram through which large distances between combined clusters results in a large "branch" in the chart (Norusis, 2012). Through visually examining the dendrogram, a n -cluster solution can be selected based on distances between clusters (Mooi & Sarstedt, 2011).

Next, a k -means cluster analysis was defined where the number of clusters was predefined as n number of clusters selected through the hierarchical cluster analysis (Mooi & Sarstedt, 2011). In k -means cluster analysis, k represents the number of clusters that are predefined in the analysis. In this analysis, unlike hierarchical cluster analysis, a respondent is "assigned to the cluster for which its distance to the cluster mean is the smallest" (Vaske & Sponarski, 2019, p. 663). Through a multi-step reclassification process, cluster centers (means) are defined and redefined until cluster means stay relatively constant with each consecutive reclassification and all respondents are assigned to final clusters and final cluster centers are calculated for each cluster. More background on both hierarchical and k -means cluster analysis can be found in Mooi and Sarstedt (2011) and Vaske and Sponarski (2019).

Following the establishment of activity-type clusters, all clusters were given a name based on their relative participation in all activities, and analysis of variance (ANOVA) was conducted to ensure differences between the mean levels of activity participation among clusters. Because a large number (22) of one-way ANOVAs were being run simultaneously to this end, a Bonferroni correction was used to reduce the risk of Type 1 error (Vaske, 2008). Levene's F test was used in each ANOVA to determine if equality of variance could be assumed for activity types. If equality of variance could not be assumed, the significance level of the omnibus test was corrected using Welch's test of Equality of Means (Vaske, 2008). Next, post hoc tests were conducted to assess the significance of differences among each of the activity-type clusters. Scheffe's S test was used when equality of variance could be assumed and Tamhane's T_2 test was used when it could not. These post hoc tests were selected based on their offering of conservative estimates of significance (Vaske, 2008).

Assessment of Differences in Substitution Behaviors

The final stage of analysis assessed differences in substitution behaviors among activity-type clusters. One-way ANOVAs were employed to this end, as the four measured substitution behaviors were not statistically correlated and therefore remained conceptually independent (Huberty & Morris, 1989). Tests of equality of variance and post hoc comparisons followed the same procedures outlined for assessing differences between activity participation among activity-type clusters. η^2 was used to assess the effect size of behavior differences between clusters, with the following thresholds: >0.01 defined as a small effect, >0.06 a medium effect, and >0.15 a large effect (Abbott, 2011).

Research Question 1:

What differences exist between participant groups?

Table 1: Differences in the composition of each participant group

	Participant Group			
	Non-Outdoor Recreationist	Existing Outdoor Recreationist	Previous, But No Longer Outdoor Recreationist	New Outdoor Recreationist
Participated in outdoor recreation regularly <i>prior</i> to the pandemic?	No	Yes	Yes	No
Participated in outdoor recreation regularly <i>during</i> the pandemic?	No	Yes	No	Yes
	No → No (n = 1,763)	Yes → Yes (n = 1,501)	Yes → No (n = 665)	No → Yes (n = 1,000) ^a
Percent of total	35.8%	30.4%	13.5%	20.3%
Gender¹				
woman	71.0% (1252)	61.9% (929)	62.1% (413)	61.7% (617)
man	27.2% (479)	36.0% (541)	35.5% (236)	36.2% (362)
non-binary	0.9% (15)	1.5% (23)	1.4% (9)	1.7% (17)
Prefer not to disclose	0.6% (11)	0.5% (7)	0.9% (6)	0.2% (2)
Prefer to self-describe	0.3% (6)	0.1% (1)	0.2% (1)	0.2% (2)
Ethnicity²				
White	74.8% (1318)	73.4% (1101)	61.8% (411)	76.6% (766)
Hispanic or Latina/Latino/Latinx	7.1% (126)	7.4% (111)	11.9% (79)	7.5% (75)
Black or African American	9.2% (163)	11.3% (170)	14.7% (98)	8.0% (80)
Native American, American Indian, or Alaska Native	1.2% (21)	1.2% (18)	2.0% (13)	1.0% (10)
Asian or Pacific Islander	5.0% (88)	4.6% (69)	6.3% (42)	5.5% (55)
Other	1.4% (24)	1.3% (19)	1.7% (11)	1.1% (11)
Prefer not to say	1.3% (23)	0.9% (13)	1.7% (11)	0.3% (3)
Community Type^{3*}				
Rural (population < 5,000)	30.9% (545)	31.2% (469)	25.9% (172)	29.7% (297)
Urban cluster (population between 5,000 and 50,000)	25.0% (440)	26.6% (400)	22.4% (149)	24.6% (246)
Urbanized area (population > 50,000)	44.1% (778)	42.1% (632)	51.7% (334)	45.7% (457)
Income⁴				
\$0 - \$40,000	53.8% (948)	40.7% (611)	47.2% (314)	39.3% (393)
\$41,000 - \$60,000	17.8% (314)	22.6% (339)	20.2% (134)	21.1% (221)
\$61,000 - \$80,000	10.6% (187)	14.5% (217)	13.1% (87)	14.5% (145)
> \$80,000	17.8% (314)	22.3% (334)	19.5% (130)	25.1% (251)
Age⁵				
Mean	54	46	44	42

^aSampling ceased once 1,000 valid responses were collected for the No → Yes group.

¹ Pearson's Chi Square Test showed that a statistically significant difference exists in the proportion of women within the participant groups at a 99.9% confidence interval.

² Pearson's Chi Square Test showed that a statistically significant difference exists in the portion of BIPOC individuals within the participant groups at a 99.9% confidence interval.

³ A Kruskal-Wallis H test showed that a statistically significant difference exists in community types between the participant groups at a 99.9% confidence interval.

⁴A Kruskal-Wallis H test showed that a statistically significant difference exists in income between the participant groups at a 99.9% confidence interval.

⁵Welch's ANOVA test showed a statistically significant difference exists in age between the participant groups at a 99.9% confidence interval.

*New outdoor recreationists indicated residing in the following geographic areas of the U.S.: Northeast $n=210$; South $n=190$; Midwest $n=370$; West $n=230$.

Note: Tests used to analyze differences between participant groups were determined based on guidance from Vaske (2008) and Calver & Fletcher (2020).

Based on the initial screening question, $n=1,763$ respondents indicated that they did not participate regularly in outdoor recreation prior to the pandemic or during the pandemic (Table 1). A total $n=1,501$ indicated that they did participate regularly in outdoor recreation prior to the pandemic, and continued to do so regularly during the pandemic. Another subset of respondents ($n=665$) indicated that they did participate regularly in outdoor recreation prior to the pandemic, but did not continue to do so during the pandemic.

Given the national, geographically representative (purposefully not census-matching) nature of this study, these findings suggest that 35.7% of the U.S. could be considered non-outdoor recreationists both prior to and during the pandemic. The proportion of women in this non-outdoor recreationist group differed significantly from the other groups (existing, those that stopped, and those that are new), as did their community type, income, and age. These non-outdoor recreationists tend to be older and earn significantly less annually than the other groups.

These findings also suggest that 30.4% of the U.S. could be considered as outdoor recreationists both prior to and during the pandemic (i.e., existing outdoor recreationists). Respondents in this category were significantly younger and had higher household incomes than non-outdoor recreationists, on average.

Interestingly, 13.5% of the sample population indicated having participated in outdoor recreation prior to the pandemic, but no longer participating regularly during the pandemic. While the proportion of respondents in this category was much smaller, this group significantly differed from other groups by tending to be more diverse (61.8% white; 14.7% Black or African American; 11.9% Hispanic or Latina/Latino/Latinx) and living in more urban areas (51.7% residing in areas with populations greater than 50,000).

Perhaps most interesting is the comparison between non-, existing, and ceasing outdoor recreationists and those who are new to outdoor recreation (20.2%) amidst the pandemic. With regard to gender, these new outdoor recreationists mimic existing outdoor recreationists (61.7% identified as a woman), but they are the least racially diverse (76.6% white) and the youngest of the participant groups ($M=42$). Additionally, these individuals have significantly higher household incomes compared to those who stopped participating in outdoor recreation during the pandemic and those who did not participate prior to and during the pandemic.

Taken together (existing and new outdoor recreationists during the pandemic), we estimate that 50.6% of the U.S. may now be considered regularly participating outdoor recreationists.

Given that a great deal of attention and research has already been applied to existing outdoor recreationists to date, the remaining focus of this report examines behaviors of new, or pandemic-driven, outdoor recreationists.

Research Question 2:

Where are these new participants going for outdoor recreation most often?

Table 2. Since March 2020, how often have you participated in outdoor recreation in each of the following settings?

	Mean	Std. Deviation
Neighborhood or city streets	3.00	1.644
City or town parks	2.61	1.559
County or regional parks	2.06	1.536
State Parks	1.67	1.578
Private land or waters	1.67	1.625
Greenways	1.65	1.716
Wilderness Areas	1.35	1.575
State Forests	1.31	1.496
Land trust or conservancy lands	1.21	1.591
Ocean	1.11	1.476
National Forests	1.08	1.519
National Park Service sites	1.05	1.485
National Wildlife Refuges	0.97	1.480
State Game Management lands	0.95	1.503
Bureau of Land Management lands	0.86	1.483
Army Corps of Engineers recreation areas	0.72	1.443

Scale: 0 = Never, 1 = Less than once a month, 2 = Once or twice per month, 3 = Once per week, 4 = Two or three times per week, 5 = Daily or almost daily, 6 = Several times per day

New outdoor recreationists spent the most time recreating in local or regional areas such as their neighborhood or city streets ($M=3.0$; once per week), followed by their city or town parks ($M=2.61$; between once or twice per month, and once per week), and their county or regional parks ($M=2.06$; once or twice per month) (Table 2). Federal lands such as national forests ($M=1.08$) and national park sites ($M=1.05$) were visited less frequently (less than once per month on average). Of the list of possible recreation areas, Army Corps of Engineers managed lands received the lowest frequency of visitation by new outdoor recreationists.

Research Question 3:

What activities are these new outdoor recreationists doing most often?

Table 3. Since March 2020, how often have you participated in the outdoor recreation activities?

	Mean	Std. Deviation
Gardening (outdoor)	2.50	1.660
Hiking	1.91	1.487
Birdwatching or Wildlife Viewing (outdoor)	1.67	1.543
Running (outdoor)	1.63	1.750
Bicycling or Triathlon	1.44	1.538
Fishing	1.28	1.348
Backpacking	1.08	1.229
Camping or RVing	1.07	1.167
Climbing (outdoor)	.79	1.314
Boating or Sailing	.79	1.120
Flatwater Canoeing, Kayaking, Rafting, or Stand-up Paddling	.78	1.155
Motorcycling or ATVing	.67	1.264
Shooting or Archery (outdoor)	.63	1.194
Downhill Skiing or Snowboarding	.53	1.154
Hunting or Trapping	.53	1.158
Whitewater Canoeing, Kayaking, or Rafting	.53	1.064
Equestrian	.48	1.090
Scuba or Snorkeling	.47	1.128
Surfing	.43	1.044
Nordic Skiing or Snowshoeing	.41	1.012
Snowmobiling	.41	1.017
Recreational Flying	.37	.992

Scale: 0 = Never, 1 = Less than once a month, 2 = Once or twice per month, 3 = Once per week, 4 = Two or three times per week, 5 = Daily or almost daily, 6 = Several times per day

New outdoor recreationists spent the most time gardening ($M=2.5$; between once or twice per month, and once per week) and hiking ($M=1.91$; once or twice per month) (Table 3). These individuals pursued birdwatching or wildlife viewing ($M=1.67$), running outdoors ($M=1.63$) and bicycling or participating in triathlon activities ($M=1.44$) slightly less, approximately once per month on average. Fishing ($M=1.28$), backpacking ($M=1.08$), and camping or RVing ($M=1.07$) saw participation less than once a month, on average.

Research Question 4:

What clusters—based on activity types—exist among new outdoor recreationists?

Table 4. Results of a k-means cluster analysis of outdoor recreation activity types

Activity***	Overall Mean	Generalist Recreationists (n = 122)	Runners (n = 180)	Hunters & Anglers (n = 57)	Casual Recreationists (n = 276)	Purist Gardeners (n = 231)	High Intensity Recreationists (n = 36)
Backpacking	1.08	2.15 ^a	0.93 ^b	2.79 ^c	0.65 ^d	0.54 ^d	2.36 ^{a,c}
Bicycling or Triathlon	1.44	2.52 ^a	1.74 ^b	2.98 ^a	0.90 ^c	0.64 ^c	3.06 ^a
Birdwatching or Wildlife Viewing (outdoor)	1.67	2.67 ^a	1.21 ^b	2.54 ^{a,c}	0.91 ^b	2.01 ^c	2.72 ^{a,c}
Boating or Sailing	0.79	1.38 ^a	0.46 ^b	2.21 ^c	0.41 ^b	0.42 ^b	3.47 ^d
Camping or RVing	1.07	1.65 ^a	0.78 ^b	2.65 ^c	0.64 ^b	0.80 ^b	3.03 ^c
Climbing (outdoor)	0.79	1.66 ^a	0.48 ^b	3.09 ^c	0.30 ^b	0.14 ^d	3.67 ^c
Downhill Skiing or Snowboarding	0.53	0.95 ^a	0.21 ^b	2.96 ^c	0.09 ^{b,d}	0.06 ^d	3.28 ^c
Equestrian	0.48	0.83 ^a	0.12 ^b	2.46 ^c	0.13 ^b	0.09 ^b	3.25 ^c
Fishing	1.28	2.30 ^a	0.92 ^{b,d}	3.09 ^c	0.70 ^b	1.09 ^d	2.44 ^{a,c}
Flatwater Canoeing, Kayaking, Rafting, or Stand-up Paddling	0.78	1.57 ^a	0.44 ^b	2.74 ^c	0.34 ^b	0.35 ^b	2.81 ^c
Recreational Flying	0.37	0.49 ^a	0.06 ^b	2.77 ^c	0.03 ^b	0.03 ^b	2.50 ^c
Gardening (outdoor)	2.50	3.07 ^a	2.51 ^b	2.91 ^{a,b}	0.93 ^c	3.83 ^d	3.31 ^{a,d}
Hiking	1.91	2.80 ^{a,b}	2.07 ^c	3.37 ^a	1.38 ^d	1.52 ^{d,e}	2.25 ^{b,c,e}
Hunting or Trapping	0.53	0.99 ^a	0.09 ^b	3.81 ^c	0.12 ^b	0.14 ^b	1.53 ^a
Motorcycling or ATVing	0.67	1.20 ^a	0.31 ^b	3.49 ^c	0.22 ^b	0.28 ^b	2.22 ^d
Nordic Skiing or Snowshoeing	0.41	0.60 ^a	0.07 ^b	2.93 ^c	0.04 ^b	0.04 ^b	2.81 ^c
Running (outdoor)	1.63	2.45 ^a	3.67 ^b	3.47 ^{b,c}	0.61 ^d	0.20 ^d	2.64 ^{a,c}
Scuba or Snorkeling	0.47	0.60 ^a	0.15 ^b	3.09 ^c	0.05 ^b	0.10 ^b	3.17 ^c
Shooting or Archery (outdoor)	0.63	1.11 ^a	0.29 ^{b,d}	2.81 ^c	0.15 ^b	0.34 ^d	2.69 ^c
Snowmobiling	0.41	0.61 ^a	0.06 ^b	2.68 ^c	0.07 ^b	0.03 ^b	2.89 ^c
Surfing	0.43	0.61 ^a	0.14 ^b	2.56 ^c	0.06 ^b	0.05 ^b	3.08 ^c
Whitewater Canoeing, Kayaking, or Rafting	0.53	0.91 ^a	0.18 ^b	2.54 ^c	0.14 ^b	0.15 ^b	3.19 ^c

Note. Scale: 0 = Never, 1 = Less than once a month, 2 = Once or twice per month, 3 = Once per week, 4 = Two or three times per week, 5 = Daily or almost daily, 6 = Several times per day

***All activities had significantly different rates of participation between clusters at the .002 level (Bonferroni correction: .05/2=.002).

Different superscripts indicate significantly different ($p < .05$) means using a Tamhane's T2 post-hoc test.

Demographic information regarding activity-based clusters of new outdoor recreationists are depicted in Appendix A.

To further examine the frequency of activity type by preference, additional analyses demonstrated unique segmentation or cluster characteristics among the new outdoor

recreationists, including “general recreationists,” “runners,” “hunters and anglers,” “casual recreationists,” “purist gardeners,” and “high intensity recreationists” (Table 4).

“General recreationists” ($n=122$) participated in gardening outdoors the most ($M=3.07$; more than once per week), followed by hiking ($M=2.8$), birdwatching or wildlife viewing ($M=2.67$), bicycling or participating in triathlon activities ($M=2.52$), and running outdoors ($M=2.45$), on average.

The “runners” group ($n=180$) participated in outdoor running more than once per week ($M=3.67$), on average, which was the only activity these new outdoor recreationists participated in at this frequency.

New outdoor recreation “hunters and anglers” were a smaller group ($n=57$), but these individuals participated in a variety of activities with regularity. For example, these recreationists participated in hunting and trapping ($M=3.81$) the most, followed by motorcycling and ATV riding ($M=3.49$), running outdoors ($M=3.47$), hiking ($M=3.37$), and fishing, outdoor climbing, and scuba diving or snorkeling ($M=3.09$, for each activity), at a rate of more than once per week, on average.

“Casual outdoor recreationists” ($n=57$) participated in all activities with the least frequency, compared to the other groups, on average. Hiking ($M=1.38$) was the only activity that was reported as taking place more than once per month.

“Purists gardeners” ($n=231$) participated in outdoor gardening more than once per week ($M=3.83$), on average, which was the only activity these new outdoor recreationists participated in at this frequency. For these individuals, birdwatching or wildlife viewing ($M=2.01$) was the second most frequented activity, which was participated in once or twice per month.

Finally, “high intensity recreationists” participated in a variety of activities with high regularity. For example, these new outdoor recreationists participated in outdoor climbing ($M=3.67$), boating or sailing ($M=3.47$), gardening outdoors ($M=3.31$), downhill skiing or snowboarding ($M=3.28$), horseback riding/equestrian ($M=3.25$), whitewater canoeing, kayaking and rafting ($M=3.19$), scuba diving or snorkeling ($M=3.17$), surfing ($M=3.08$), bicycling or participating in triathlon activities ($M=3.06$), and camping or RVing ($M=3.03$), all at a rate of more than once per week, on average.

Research Question 5:

Why did these new participants get involved in outdoor recreation?

Table 5. Motivations for beginning participation in outdoor recreation during the COVID-19 pandemic.

Motivations ¹	Mean	Std. Deviation
Improved Sense of Relaxation	2.6473	.96948
Improved Physical Fitness and Cardiovascular Health	2.6413	.96428
Improved Mental Health	2.4443	.98696
Improved Connection to Nature	2.2527	1.00136
Improved Sense of Safety while continuing to be able to participate in leisure activities during the pandemic	2.2203	1.03256
Improved Family Togetherness	2.1977	1.21439
Improved Self-Efficacy	2.1533	1.12268
Improved Friendships	2.0763	1.17146
Improved Perception among Peers	1.3897	1.19533

Scale: 0 = Not at all true, 1 = Slightly true, 2 = Moderately true, 3 = Very true, 4 = Completely true

¹Motivations were derived using a confirmatory factor analysis of three motivation indicators for each motivation.

Motivation indicators were derived from Driver & Bruns (2008).

New outdoor recreationists indicated participating in outdoor activities to fulfill motivations predominantly associated with health and well-being, such as seeking an improved sense of relaxation ($M=2.65$), improved physical fitness and cardiovascular health ($M=2.64$), and mental health ($M=2.44$) (Table 5). These items, on average, were considered as “moderately true” to “very true” reasons for beginning participation in outdoor recreation.

Research Question 6:

What sources were most used by new participants to find information about outdoor recreation?

Table 6. As you began to participate in outdoor recreation following the beginning of the COVID-19 pandemic, to what degree did you rely on the following sources to find information about recreation areas (e.g., parks, forests, etc.) and outdoor recreation?

Information Sources	Mean	Std. Deviation
Previous personal experience	2.45	1.101
Friends	2.06	1.224
Signage within recreation areas	1.79	1.210
Agency websites/apps (e.g., city parks and rec, National Park Service, etc.)	1.77	1.273
Other websites/apps (e.g., Alltrails, Hiking Project, The Outbound, etc.)	1.58	1.332
Agency social media accounts (e.g., city parks and rec, National Park Service, etc.)	1.40	1.228
Staff within recreation areas	1.35	1.263
Brochures within recreation areas	1.28	1.205
Fitness websites/apps (e.g., Strava)	1.25	1.305
Non-agency social media accounts (e.g., outdoor recreation influencers, REI, Leave No Trace, etc.)	1.15	1.247

Scale: 0 = Not at all, 1 = Somewhat, 2 = Moderately, 3 = Strongly, 4 = Extremely

As new outdoor recreationists sought information about recreational areas and activities, they most frequently relied upon previous personal experiences ($M=2.45$; moderately to strongly), and to a slightly lesser degree, friends ($M=2.06$; moderately), on average (Table 6). The sources relied upon the least were non-park-related social media accounts such as outdoor recreation influencers, outdoor gear manufacturers, or non-agency social media accounts ($M=1.15$), although these sources were still rated as being “somewhat” relied upon.

Research Question 7:

What were the most helpful factors in aiding people's transition to outdoor recreation during the pandemic?

Table 7. As you began to participate in outdoor recreation following the beginning of the COVID-19 pandemic, to what degree did the following items aid your transition or return to outdoor recreation?

Information Sources	Mean	Std. Deviation
Seeking out areas where I felt comfortable or safe	2.35	1.130
Increased free time during the COVID-19 pandemic	2.31	1.118
Decreased crowding at recreation areas during the COVID-19 pandemic	2.16	1.210
Information provided by friends	2.07	1.218
Learning about the health benefits of outdoor recreation during the COVID-19 pandemic	2.04	1.193
Signage within recreation areas	1.82	1.240
Programs to increase pedestrian infrastructure during COVID-19-related lockdowns	1.62	1.258
Having additional family/roommates at home to help with daily tasks	1.59	1.295
Agency websites/apps (e.g., city parks and rec, National Park Service, etc.)	1.59	1.240
Changes in finances	1.56	1.311
Brochures within recreation areas	1.52	1.264
Staff within recreation areas	1.52	1.270
Other websites/apps (e.g., Alltrails, Hiking Project, The Outbound, etc.)	1.44	1.306
Agency social media accounts (e.g., city parks and rec, National Park Service, etc.)	1.42	1.268
Fitness websites/apps (e.g., Strava)	1.29	1.322
Seeing myself represented in outdoor industry marketing materials (e.g., online ads, social media posts, etc.)	1.24	1.262
Non-agency social media accounts (e.g., outdoor recreation influencers, REI, Leave No Trace, etc.)	1.19	1.208

Scale: 0 = Not at all helpful, 1 = Somewhat helpful, 2 = Moderately helpful, 3 = Very helpful, 4 = Extremely helpful

We were also interested in how useful information and marketing sources, as well as pandemic-influenced circumstances, were for aiding the new outdoor recreationists' participation (Table 7). Therefore, we included several of the same items included in Table 6, but we also asked about additional items focused on time, belonging, and identity. New outdoor recreation respondents noted that seeking areas where they felt comfortable and safe ($M=2.35$), and increased free time during the COVID-19 pandemic ($M=2.31$)—which were both perceived as moderately helpful—aided with the transition to outdoor recreation more than the other variables. Additional items that were perceived as moderately useful included decreased crowding at recreation areas during the pandemic ($M=2.16$), information provided by friends ($M=2.07$), and learning about the health benefits of outdoor recreation during the pandemic ($M=2.04$).

The elements that were perceived as least helpful were fitness websites and apps ($M=1.29$), seeing themselves represented in outdoor industry marketing materials ($M=1.24$), and non-park-related social media accounts such as outdoor recreation influencers, outdoor gear

manufacturers, or non-agency social media accounts ($M=1.19$). However, these items were still rated as being “somewhat helpful.”

Research Question 8: How will new outdoor recreationists' participation change after the pandemic?

Table 8. Do you perceive that you will continue to participate in outdoor recreation at least once per month following the World Health Organization's official announcement ending the COVID-19 pandemic?

	Frequency	Percent
Definitely not	4	0.4%
Probably not	28	2.8%
Maybe	135	13.5%
Probably yes	331	33.1%
Definitely yes	502	50.2%

Given that these data suggest that 20.2% of our sample are new to outdoor recreation amidst the pandemic, we wanted to know if their outdoor behaviors were here to stay once the pandemic ended (Table 8). Approximately 83.3% of these new outdoor recreationists indicated that the behavior was likely here to stay (probably 33.1%; definitely 50.2%). Only 3.2% of the respondents indicated that their behavior was probably not going to continue (definitely not 0.4%; probably not 2.8%).

Table 9. Perceived future substitution behaviors among respondents, following the end of the COVID-19 pandemic.

Following the World Health Organization's official announcement ending the COVID-19 pandemic, I will...	Mean	Std. Deviation
...substitute my current outdoor recreation activities for different outdoor recreation activities that I could not do during the pandemic.	.14	1.075
...substitute where I participate in outdoor recreation by going further from home to recreate.	.11	1.082
...substitute some of the time I spend doing outdoor recreation activities for the activities I previously did instead of outdoor recreation during my free time, prior to COVID-19 pandemic.	-.06	1.100
...completely stop my participation in outdoor recreation.	-1.24	1.121

Scale: -2 = Strongly disagree, -1 = Somewhat disagree, 0 = Neither agree nor disagree, 1 = Somewhat agree, 2 = Strongly agree

Substitution items derived from Dawson et al. (2011) and Orr & Schneider (2018).

Approximately 83% of respondents indicated that they perceive that they will either probably or definitely continue to participate in outdoor recreation at least once per month following the World Health Organization's official announcement ending the COVID-19 pandemic (Table 9). Only 0.4%

of respondents indicated that they perceive definitely not participating at this rate following the end of the pandemic.

New outdoor recreationists were also asked about their perceived post-pandemic participation in outdoor recreation (Table 9). Respondents were fairly neutral regarding potentially substituting for a different outdoor recreation activity ($M=.14$), substituting where they recreate by going further from home ($M=.11$), or substituting some of the time now spent on outdoor recreation for activities they participated in prior to the pandemic ($M=-.06$). However, respondents “somewhat” to “strongly disagreed” ($M=-1.24$), on average, that they would completely stop their participation in outdoor recreation post-pandemic.

Research Question 9: How do perceived post-pandemic substitution behaviors vary across types of new outdoor recreationists?

Table 10. Differences in perceived future substitution behaviors among respondents—following the end of the COVID-19 pandemic—between activity clusters.

Following the World Health Organization's official announcement ending the COVID-19 pandemic, I will...	Mean	Std. Deviation	Eta ²
...substitute my current outdoor recreation activities for different outdoor recreation activities that I could not do during the pandemic. ‡	.14**	1.075	0.020
Generalist Recreationists	0.34 ^a	1.027	
Runners	0.26 ^{ab}	1.075	
Hunters & Anglers	0.21 ^{ab}	1.031	
Casual Recreationists	0.09 ^{ab}	1.021	
Purist Gardeners	-0.06 ^b	1.144	
High Intensity Recreationists	0.44 ^{ab}	1.054	
...substitute where I participate in outdoor recreation by going further from home to recreate. ‡	.11***	1.082	0.022
Generalist Recreationists	0.35 ^{a,c}	1.044	
Runners	-0.09 ^b	1.132	
Hunters & Anglers	0.11 ^{ab,c}	.920	
Casual Recreationists	0.11 ^{ab,c}	1.056	
Purist Gardeners	0.08 ^{ab,c}	1.112	
High Intensity Recreationists	0.58 ^{a,c}	.967	
...substitute some of the time I spend doing outdoor recreation activities for the activities I previously did instead of outdoor recreation during my free time, prior to COVID-19 pandemic. ‡	-.06**	1.100	0.017
Generalist Recreationists	-0.16 ^{ab}	1.128	
Runners	0.14 ^a	1.058	
Hunters & Anglers	-0.09 ^{ab}	1.123	
Casual Recreationists	-0.04 ^{ab}	1.085	
Purist Gardeners	-0.24 ^b	1.083	
High Intensity Recreationists	0.22 ^{ab}	1.222	

...completely stop my participation in outdoor recreation.*	-1.24****	1.121	0.216
Generalist Recreationists	-1.09 ^a	1.171	
Runners	-1.41 ^{ab}	1.007	
Hunters & Anglers	.32 ^c	1.088	
Casual Recreationists	-1.35 ^a	1.039	
Purist Gardeners	-1.64 ^b	.767	
High Intensity Recreationists	.03 ^c	1.108	

Scale: -2 = Strongly disagree, -1 = Somewhat disagree, 0 = Neither agree nor disagree, 1 = Somewhat agree, 2 = Strongly agree

**Statistically significant difference between at least two clusters at a 99% confidence interval.

***Statistically significant difference between at least two clusters at a 99.9% confidence interval.

‡Homogeneity of variance can be assumed, Scheffe's S post hoc test was used to compare between activity clusters.

*Homogeneity of variance cannot be assumed, Welch's test of Equality of Means was used to correct the significance level of the omnibus test and Tamhane's T2 post hoc test was used to compare between activity clusters. Different superscripts indicate significantly different ($p < .05$) means using a Scheffe's S or Tamhane's T2 post hoc test.

Given the importance of further understanding the post-pandemic behaviors of this new outdoor recreation demographic, which these data suggest could represent approximately 20% of the U.S., we examined these individuals further by activity groups (Table 10; see Table 4 for cluster references).

Perceived future substitution behaviors significantly differed ($p \leq .01$) across all four substitution items (Table 4). Effect sizes (η^2) for three of the four items were small, while the effect size for "completely stop my participation in outdoor recreation" was large (Abbott, 2011).

Most of the groups were fairly neutral regarding whether or not they may substitute their outdoor recreation activity post-pandemic. However, "high intensity recreationists" ($M=.44$) and "general recreationists" ($M=.35$) were slightly more inclined than the other groups, on average. Furthermore, "general recreationists" were significantly more inclined than "purist gardeners" ($M=-.06$) to substitute their activities, on average.

With regard to substituting their outdoor recreation location for an area further from home, again, most groups were fairly neutral, on average. However, "high intensity recreationists" ($M=.58$) and "general recreationists" ($M=.34$) were slightly more inclined than the other groups, on average. Furthermore, both of these groups were significantly more inclined to pursue areas further from home than "runners" ($M=-.09$), on average.

With regard to completely stopping their participation in outdoor recreation post-pandemic, the groups differed significantly in a number of ways. "Purist gardeners" ($M=-1.64$) indicated having the least agreement with potentially stopping their outdoor recreation activity, followed by "runners" ($M=-1.41$) and "casual recreationists" ($M=-1.35$), on average. "Hunters and anglers" ($M=.32$) and "high intensity recreationists" ($M=.03$) were the most neutral regarding the potential for stopping their activities after the pandemic ends, on average.

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Appendix A: Demographic Characteristics of Activity Clusters

Generalist Gardeners

Runners

Hunters & Anglers

Casual Recreationists

Purist Gardeners

High Intensity Recreationists

Note: Rural = population < 5,000; Urban cluster = population between 5,000 and 50,000; Urbanized area = population > 50,000.

Purist Gardeners were composed of the least ethnic diversity, with 93% of the cluster being white, while also having largest portion of women within the cluster (76%). This cluster also had the largest percentage of household incomes below \$61,000 (68%). Hunters & Anglers represent the

group boasting the greatest ethnic diversity, with 55% of the cluster being non-white. High Intensity Recreationists had the largest portion of cluster members with a household income larger than \$80,000 (36%). Hunters & Anglers and Purist Gardeners boasted the largest portions of their respective cluster members living in rural areas (36% and 38%, respectively). Runners and Generalist Gardeners boasted the largest portions of their respective cluster members living in urbanized areas (55% and 52%, respectively).