

# Exploring Social Benefits of Natural Turfgrass through In-Person Exposure

## *Full Report*

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**Introduction:** With the growth of population in urban areas, demands for green space in cities to be as multifunctional as possible has led to alternative forms of urban green spaces. One such form is the installation of artificial turf, both as new spaces and as a replacement for natural grass. This phenomenon has occurred across both publicly and privately owned spaces within urban areas. On the surface artificial turf surfaces may seem to come with several benefits over natural turfgrasses; however, drawbacks to artificial turf have generally been downplayed or outright ignored. One area where little research exists is in general population perceptions of artificial turf surfaces. Our previous work funded by WTSC entitled “*Investigating the Social Benefits of Natural Turfgrass in Urban Areas*,” sought to form a baseline for how individuals feel about artificial turf compared to natural turf. The current project extends those findings via in-person exposures to both natural and artificial turf surfaces.

Our two related objectives of this project were to (1) extend the findings from the previous online research about the use differences between natural and artificial turf by conducting an in-person survey of park users about how likely they are to use each surface type and (2) gather qualitative data from park users about *why* they prefer one type of surface over another for a given use case.

**Executive Summary:** The current study leveraged an in-depth case study of park visitors in Minnesota to assess comparisons in likelihood of use, sustainability beliefs, and the reasons behind those responses between artificial and natural turf surfaces. A portion of this work (use cases and sustainability) were replicated from a previous online study to see if exposure to and interactions with the surfaces impacted participant response. Data collection was done in-person where participants were encouraged to interact with both types of surfaces at park locations that had close proximity of both surface types.

Overall, the differences found in the original online survey in which natural turf was preferred across the majority of use cases (sans organized sports) as well as sustainability related beliefs were *enhanced* by in-person interactions with both surfaces. This widening gap was driven predominantly by significant declines in the likelihood of use for artificial turf after interacting with it. Conversely, the likelihood to use natural turfgrass for use cases with a high amount of surface contact (e.g., playing with a pet, having a picnic) improved after in-person interactions. Related to sustainability beliefs, natural turfgrass was still preferred by participants confirming the online survey results. However, in-person interactions with both surfaces impacted scores for sustainability items negatively, but more dramatically for artificial turf. Specifically, participants' feelings related to artificial turf being ‘environmentally friendly’ and ‘contributing to ecosystem health’ declined significantly. Narrative responses provided rich qualitative data as to some of the reasoning behind the widening gap between the two surface types. Responses focused on the consistent nature of artificial turf compared to natural turf, but simultaneously participants expressed risks associated with injuries and discomfort while using artificial turf. Positive aspects of natural turfgrass centered around its naturalness.

The current case study provides additional evidence on-top of the online survey related to preferences for natural turfgrass across the majority of use cases and sustainability beliefs broadly. In addition, the narrative responses provide details of the reasons behind participant preferences which demonstrate concerns among individuals as to their discomfort, injury risks, and environmental concerns

about artificial turfgrass while favoring natural turf ‘naturalness’ as a defining feature. These findings can be utilized in outreach and marketing and also for decision makers to be better informed as to resident concerns related to artificial turf and preferences for natural turf surfaces on public lands.

**Methodology:** An in-person survey was conducted from July to September of 2021 in two parks, Como Park and Pamela Park in Saint Paul and Edina, Minnesota respectively among park visitors (Figure 1). The two parks were chosen specifically for the close proximity of artificial and natural turf surfaces which would help to facilitate in-person experiences of both surfaces. The reason for this choice is two-fold: first to minimize participant burden and second to maximize comparative timing between the experience of each surface type. Individuals were included in the sample if they were 18 years of age or older and consented to participate in the study. Park visitors were approached by surveyors in the parks positioned at high traffic areas that were near the proximate artificial and natural turf surfaces. Once individuals consented to participate, they were asked to ‘experience’ the two surfaces one at a time, this varied by participant in abilities (e.g., walking on each surface, laying down, feeling, etc.). Once the participants had experienced each surface, they were asked to complete a short questionnaire either on paper or online via scanning a quick response (QR) code presented by the surveyors. The survey asked about their likelihood to use each surface, how they felt about each surface related to multiple sustainability related items, and open qualitative response where participants were able to explain how they felt about each surface after experiencing them.

Figure 1. *Como Park (top) & Pamela Park (bottom) Turfgrass Surface Areas*



**Results:** In total we received 50 completed usable responses that were included in the analysis. Results are broken down into the main question categories, beginning with the sample sociodemographics, then use differences between artificial and natural turf, and finally sustainability beliefs between artificial and natural turf. The use differences and sustainability beliefs data will be presented in comparison to the previous online survey.

*Sociodemographics*

Basic sociodemographic information was collected from participants including age, gender, race, and if the participant had kids or pets. The average age of participants was 32 with a range between 18 and 73. In terms of gender, the sample was 52% male and 48% female. Racial characteristics of the sample included 86% Caucasian/White, 5% Hispanic/Latino, 5% Mixed/Biracial, 2% African American/Black and 2% Asian American/Asian. 23% of participants had kids and 60% had pets.

*Likelihood of Use Differences*

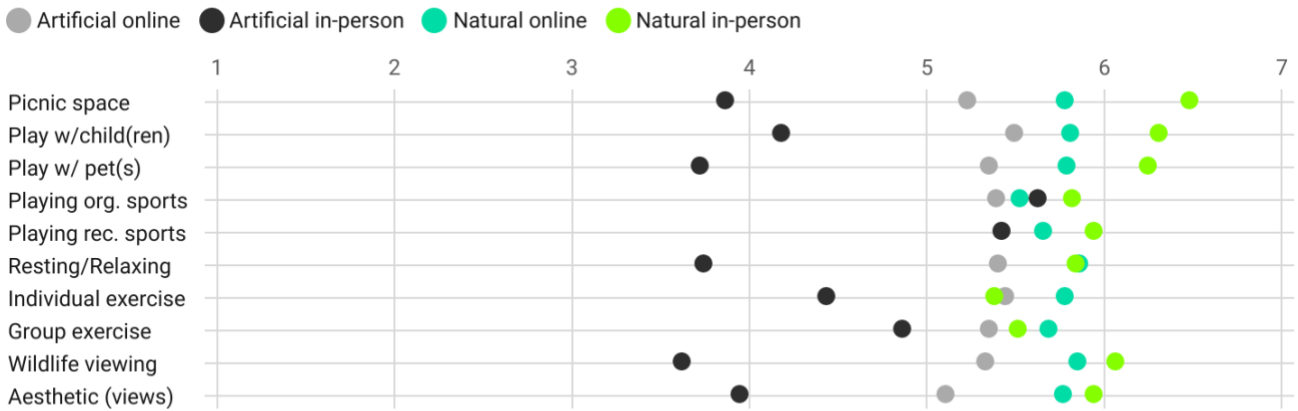
Participants in the current study answered the same 10 questions related to their likelihood to use artificial and natural turfgrass surfaces for a variety of use cases that was asked in the previous online survey. Scale items were measured on a 1-7 Likert scale with 1 = extremely unlikely and 7 = extremely likely. Results for the artificial in-person sample were lower across all use cases except for the playing of organized and recreational sports. Comparatively, the impact of in-person exposure on natural turf uses were less significant and mixed. A visualization of these divergences can be seen in Figure 3.

Table 1. *Likelihood of use differences between in-person vs. online samples*

	Artificial			Natural		
	Online <i>M(SD)</i>	In-person <i>M(SD)</i>	Significance* (Direction)	Online <i>M(SD)</i>	In-person <i>M(SD)</i>	Significance* (Direction)
Picnic space	5.23(1.68)	3.86(2.55)	High (-)	5.78(1.40)	6.48(0.89)	High (+)
Playing with child(ren)	5.49(1.53)	4.18(2.18)	High (-)	5.81(1.38)	6.30(0.97)	Low (+)
Playing with pet(s)	5.35(1.62)	3.72(2.29)	High (-)	5.79(1.34)	6.24(0.98)	Low (+)
Playing org. sports	5.39(1.64)	5.62(1.71)	None	5.52(1.52)	5.82(1.27)	None
Playing rec. sports	5.42(1.54)	5.42(1.75)	None	5.65(1.44)	5.94(1.20)	None
Rest/Relaxation	5.40(1.55)	3.74(2.45)	High (-)	5.86(1.34)	5.84(1.33)	None
Individual exercise	5.44(1.46)	4.43(2.15)	High (-)	5.78(1.30)	5.38(1.41)	Low (-)
Group exercise	5.35(1.58)	4.86(2.09)	Low (-)	5.69(1.44)	5.51(1.31)	None
Wildlife viewing	5.33(1.70)	3.62(2.81)	High (-)	5.85(1.39)	6.06(1.62)	None
Aesthetics(views)	5.10(1.76)	3.94(2.50)	High (-)	5.77(1.48)	5.94(1.30)	None

\*Significance levels, High =  $p < .0001$ , Medium =  $p < .001$ , Low =  $p < .01$ , None =  $p > .05$

Figure 3. Likelihood of use between artificial and natural turfgrass online and in-person samples



1 = Extremely Unlikely, 4 = Neither Likely nor Unlikely, 7 = Extremely Likely  
 Created with Datawrapper

**Likelihood of Use Differences Takeaways**

- Overall, the gap between the likelihood of use between artificial and natural turf expanded after in-person exposures.
- In-person exposures had a significant impact on use likelihoods across all uses for artificial turf and 4/10 uses for natural turf.
- In-person exposure to artificial turf had significant and negative effects on likelihood to use across all but two use cases (organized and recreational sports playing).
- In-person exposure to natural turf had mixed effects, increasing likelihood of use as a picnic space, playing with child(ren), and playing with pet(s) but a negative impact on a likelihood to use it for individual exercise

**Sustainability Beliefs**

Participants in the current study answered the same 5 questions related to sustainability aspects of artificial and natural turfgrasses that were asked in the previous online survey. Scale items were measured on a 1-7 Likert scale with 1 = strongly disagree and 7 = strongly agree. In other words, the higher the number the more positive the rating. Results for the in-person sample were universally lower than those from the online sample across both artificial and natural turfgrasses. However, the significance and direction of those differences diverge between the two surface types. Across all the sustainability items related to artificial turfgrass, ratings were lower and highly statistically significant for the in-person sample compared to the online sample. This is compared to natural turfgrass ratings, which were lower in-person but only 3 categories were statistically significant and only one (Environmentally friendly) was highly significant.

Table 2. Sustainability beliefs for in-person and online samples

	Artificial			Natural		
	Online <i>M(SD)</i>	In-person <i>M(SD)</i>	Significance* (Direction)	Online <i>M(SD)</i>	In-person <i>M(SD)</i>	Significance* (Direction)
Made of sustainable materials	5.15(1.35)	4.24(1.49)	High (-)	5.31(1.36)	5.10(1.63)	None
Environmentally friendly	5.09(1.40)	3.81(1.62)	High (-)	5.55(1.24)	4.94(1.61)	High (-)
Uses less natural resources	4.95(1.42)	4.19(1.65)	High (-)	4.88(1.49)	4.17(1.66)	Medium (-)
Contributes to human health	4.92(1.38)	3.94(1.51)	High (-)	5.37(1.26)	5.21(1.50)	None
Contributes to ecosystem health	4.85(1.49)	3.64(1.61)	High (-)	5.38(1.34)	4.85(1.71)	Medium (-)

\*Significance levels, High =  $p < .0001$ , Medium =  $p < .001$ , Low =  $p < .01$ , None =  $p > .05$

#### ***Sustainability Beliefs Takeaways***

- Overall, natural turfgrass is viewed as more sustainable than artificial turfgrass across all items except the use of natural resources in which they are viewed equally.
- In-person exposure to both artificial and natural surfaces lowered ratings related to sustainability compared to the previous online sample
- In-person exposure to artificial turf impacted sustainability related ratings in a highly significant way across all sustainability items.
- In-person exposure to natural turfgrass only impacted the aspect of use of natural resource item in a highly significant way

#### ***Narrative Responses***

In addition to the quantitative Likert scales, participants were asked to explain reasons behind their ratings of both artificial and natural turfgrass in an open-ended format. A selection of participant responses are below and reflect broad concerns with characteristics of artificial turf compared to natural turfgrass. The consistency of the artificial surface was mentioned frequently as a benefit, with it being able to be used in many different weather conditions. Conversely, and sometimes simultaneously, participants mentioned negative aspects of artificial turf related to heat and injury concerns. In a similar way, individuals commented on the inconsistency of natural turf surfaces alongside management challenges such as mowing.

Table 3. *Narrative responses related to ratings of artificial vs. natural turf surfaces*

Artificial	Natural
<p>The artificial turf is a lot hotter on the foot than the natural surface, however it is a lot more consistent. The turf is smooth and especially for soccer players offers a natural feel that allows for an unaffected touch...</p>	<p>The natural surface is definitely a lot cooler and the grass feels nice where it is smooth, but there are a lot of holes and uneven grass lengths that are uncomfortable when playing soccer.</p>
<p>Great traction even when wet, not as comfortable diving or going to the ground compared to grass.</p>	<p>Much better for falling on, less traction especially when wet</p>
<p>Clean. Very hot when it's already hot and sunny outside. Easier to play pick up sports with structure. More slippery without cleats.</p>	<p>Easier to run with normal shoes. Requires more maintenance (lawn cutting). Better natural temperature control</p>
<p>Burning wounds after sliding</p>	<p>Nothing beats a good maintained grass pitch</p>
<p>It's hard to walk on but the turf doesn't feel too much different from regular grass. Tough on skin. Lots of kids using.</p>	<p>There's a lot of it but some parts are very brown. Grass seems soft</p>
<p>Carcinogenic rubber. smooth surface. Game no matter the weather. Ball moves quickly.</p>	<p>Bumpy ground; challenging to maintain; allergies</p>
<p>Wishing it was real grass. The bounce is unnatural and I wind up with terrible turf burns whenever I play.</p>	<p>Excited - fields are rarely natural anymore, so even playing on one in poor condition feels like a treat.</p>
<p>I tore my ACL, so my thoughts include "anger, frustration, pain."</p>	<p>Wow, pleasure, joy as long as it's a well maintained field.</p>

***Narrative Response Takeaways***

- Overall, narrative responses were more positive for natural turfgrass surfaces compared to artificial turfgrass surfaces.
- Artificial turf had positive responses related to the consistency of the surface and all-weather usability.
- Artificial turf had negative responses related to injuries, injury risk, and discomfort in using it.
- Natural turfgrass had positive responses related to its 'naturalness' but negative responses related to variability of the surface.

**Future Research Needs:** This study illuminates the differences between artificial and natural turf after an in-person exposure demonstrating a largely favorable outcome for natural turf over artificial in use likelihood and sustainability beliefs. Several questions remain in this area that could be addressed in future research:

- Assessing the strength of the characteristics that make natural grass preferable to artificial which could assist in outreach, education, and marketing efforts.
- Expanding the case study approach used here to assess regional, or national differences in experiences of artificial and natural turf
- Understanding how individuals feel about the role that natural and artificial turf should play in their communities.