Summary of Findings:
MAPPING@Brown Focus Group Discussions

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Between November 14th and 22nd, 2022, the Center for Mobility Analysis for Pandemic Prevention Strategies (MAPPS) public health research team held a total of eight focus group discussions (FGDs). Four FGDs were with Brown University faculty and staff, and four were with Brown University undergraduate and masters students. A total of 28 Brown community members participated, of which 3 were masters students, 18 were undergraduate students, and 7 were staff members. Participants reported hearing about the FGDs through the campus-wide Today@Brown email digest, posters, and word of mouth.

Each focus group session began with an overview of MAPPING@Brown as envisioned by MAPPS researchers. Facilitators explained the study, led by Dr. Mark Lurie in the Department of Epidemiology, was being designed and conducted in conjunction with colleagues from the computer science, engineering, mathematics, and ethics faculties. MAPPS was presented, in basic terms, as a research endeavor using "mixing" data to model how infectious diseases might spread in different contexts and what types of interactions are riskiest and therefore the most effective to target in prevention efforts. Participants were told that MAPPING@Brown, a campus-based proof of concept study, will use a mobile application to collect mobility data with the goal of mapping the social network at Brown, including faculty, staff, and students. The app is envisioned to collect information based on a user's geographic location and proximity to other users. Facilitators told groups that the MAPPS computer science and cryptography groups were working on a way to de-identify that data before it's sent from a user's device to a secure central database.

The opening questions pertained to how participants interact with different modules on their smartphones that could be used to collect data as part of MAPPING@Brown. Participants were asked if they ever deactivated their phone's Bluetooth, Wi-Fi, or cellular data and, if so, how often and under what circumstances they did. Nearly all students and several staff members reported toggling Wi-Fi off frequently when on campus. This behavior was especially common when the phone user was moving between buildings. It would appear that Brown University Wi-Fi is slow in certain locations and can impede the user's ability to use cellular data if they are not logged into the network through their university account. Participants were far less likely to deactivate Bluetooth and cellular data functions. The majority of students said they kept Bluetooth on at all times, with several staff members reporting the same. The other

handful of staff members kept their Bluetooth deactivated as a default, only turning it on for a specific purpose, such as connecting to their car's entertainment system. Participants rarely put their phones in airplane mode or otherwise disabled digital data services.

Focus group participants were next asked whether they currently or historically used an application or device where they agreed to provide location data. The majority of respondents were currently using location services for navigation and asset tracking, such as through the Find My app by Apple. Several undergraduate students shared their location data to make rideshare apps and social media easier to use. All three graduate students brought up the example of contact tracing apps they opted into during 2020 and 2021. Despite general agreement about the usefulness of allowing location tracking for some applications, all staff members and about half of the students preferred restricting their data to only be shared while using the app.

The facilitators then gave a brief description of the data collection and management process and allowed participants to click through a prototype of the MAPPING@Brown app user interface (UI) designed in collaboration with Dr. Ian Gonsher and his students from the School of Engineering.

The UI was widely praised by respondents for its simplicity, intuitive design, and focus on ethics. The majority found the prototype very easy to use. One student noted, for instance, that they liked the fact that they could click through the questions without having to type anything. And while the detailed example text of the consent process was reassuring to many students and staff members, a handful of undergraduates admitted they couldn't be bothered to read the whole thing and suggested the section be shorter. When an alternative presentation of this information, such as an animated video, was suggested, the graduate students and staff were far more enthusiastic than undergraduates. When probed, most undergraduates said 30 seconds was the maximum length video they'd be likely to watch on data usage and ethics. Despite significant differences in opinion on this aspect, the FGD participants generally agreed it would benefit users to have a variety of resources on ethics and privacy available within the app.

The research team received an overwhelming positive response to the question of whether or not FGD attendees would participate in a project like MAPPING@Brown. When facilitators probed as to why, the majority of participants first cited their belief that the project was valuable as a research endeavor. The three graduate students specifically explained that their understanding of the Institutional Review Board (IRB) process and other data protection requirements made them feel comfortable trusting MAPPS with their information. Staff members uniformly reflected these views as well. While undergraduate students largely expressed support for the research endeavor, about one third of this demographic expressed a somewhat cynical attitude that they 'might as well' contribute their data to a good cause since they were already being tracked day-to-day. Many undergraduate students also described the

peer pressure of widespread enrolment as tipping them in favor of participation. Graduate students and staff members meanwhile asserted that peer uptake would not influence them one way or another.

Other potential incentives for participation mentioned by attendees were individual- and community-level data insights, monetary compensation, and small material prizes. The majority of participants were enthusiastic when asked if they would be interested in seeing some representation of the data collected on their social network during the study period. Personal data insights were of particular interest to the student demographic. The general desire was that app users be able to opt in to weekly insights. This aligns with respondents' universal preference for a 'set it and forget it' app with which they rarely had to engage. Some of the statistics discussed were where one spent the most time, what one's typical routes around campus were, and how much time one spent outside. While the students seemed to enjoy brainstorming ideas, several acknowledged that insights would have to be planned carefully so as not to affect participants' behavior during the course of the study.

The majority of students and staff agreed that periodic rewards would incentivize community participation. Conversely, several students said incentives would make them more wary of the project. One posited that incentives were unlikely to change the mind of someone resistant to participating. Among those in favor of material incentives, and free food were the most popular rewards mentioned. Part of the UI designed by the engineering students was an animated plant that 'grows' the longer a user stays in the study. Several students independently suggested that app users be able to show this module in exchange for small goodies.

After discussing their motivations for enrolling, FGD participants were asked what concerns they had about the study design. Students' primary concern was not the collection of the data per se but rather the utilization of the data going forward. The collection of any one type of data was not seen as problematic. Instead students were wary of data security after collection. Common questions were about who could see the data, whether it could be sold, how long it would be stored for, and whether it would be used for research beyond Brown. The reassurance that employers would not be able to access the data was important for staff. Several staff members did, however, desire the university's stamp of approval on the app. About a quarter of the students said the same. These individuals expressed that Brown's endorsement would be an assurance of safety and therefore an incentive to participate. The possibility of re-identification (i.e., that an individual's data could be linked to them through the use of auxiliary information) gave the majority of students some pause, though most felt reassured that the risk was minimal though existent. Re-identification was the primary concern for three of the staff members, while the other four were more worried about practical questions, such as battery life. When told battery drainage was a potential issue, the majority of FGD attendees encouraged the research team to be up front about this risk when laying out the benefits and drawbacks of enrollment.

The final question posed to the focus groups was whether or not their view of MAPPING@Brown had changed after discussing pros and cons in greater depth. The majority of participants said their attitudes had not changed. About ¾ were on board with participating at the start and said they would make the same decision after hearing more. Several participants who were on the fence after hearing the initial pitch said they had changed their minds and would participate, while several others remained uncertain. The latter group expressed that they would need to learn more before deciding. Finally, one undergraduate student said they were less likely to enroll in the study after discussing concerns with the group. The student said the conversation had revealed how uncertain the data collection and management process was, which made them nervous about the team's ability to keep their personal information safe. It therefore seems that deeper education on study design was most influential for those who were undecided after hearing the high-level pitch. The fact that the majority of respondents maintained their willingness to participate is encouraging when looking ahead to actual study recruitment.