

Tagalong

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Acknowledgements

We would like to thank our advisor, Steve Weber, for his guidance and advice throughout the entire project process, from ideation to execution.

We would also like to thank the I School faculty, staff, and academic community for two of the most memorable years of our lives. There is no doubt that the people are what made this experience memorable. We arrived in Berkeley full of anxiety and excitement about what was ahead of us. Two years after that moment we have no doubt that we could not have picked a better group of people with whom to share this experience.

Challenge

To the believers.

Pablo

First of all, I want to thank my wife. There is absolutely no way I could have been anywhere close to this moment without her, nor would I want to. Mey, your patience, support, never ending love were the fuel that kept me going not only during this past two years but since this crazy adventure started more than 4 years ago.

To my brother, my best friend, everyone should be so lucky as I am to have you have you as my brother. To my mother, who taught me that we have to follow our dreams and dream big. To enjoy everyday and live life to the fullest, and most important of all to smile even in the most difficult times and of course that family always comes first.

To my father, who always saw the best in me, even in my darkest and most difficult moments, always said that I could do whatever I set my mind to. Dad, we've come a long way. I finally understood what you've told me a long time ago, it's not only about the end line, the process and the people along the way are what really matters. I hope you are proud and everything we've accomplished.

The Team



Challenge Masekera is a data scientist, who loves turning data into actionable insights that create the best possible value and strategic direction for businesses as well as for product design and improvement. Other skills are information visualization and using ICTs for Development. Challenge is sports fanatic, history junkie, political analyst and an avid traveller.



Dan Tsai is a user experience designer and developer passionate about solving difficult problems with great design. Dan has a background in the enterprise software industry, and in his spare time races very slowly in triathlons.



Pablo Arvizu is a software engineer and data analyst, who most of all, likes to solve everyday problems. Before the I School, Pablo was an Information Management Specialist in Mexico City. His two passions in life are very clear, software development and sports.



Suhaib Syed is an interaction designer with a passion for research. Suhaib has a background in electronics engineering, specializing in robotics. Prior to the I School he was a UX designer at Deloitte Digital. In his spare time, Suhaib dives into infinite loops of information, exploring esoteric concepts ranging from international politics to cinematography.

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Introduction

Background

Personal fitness has increasingly become a major public health concern in the United States. According to National Health and Nutrition Examination Survey¹ (conducted by the National Center for Health Statistics), 68.8% of Americans are overweight or obese. Fitness plays a major role in these health concerns, since fewer than 5% of American adults participate in 30 minutes of physical activity a day².

One contributing factor to this phenomenon is the increasingly common sedentary lifestyles of many white-collar professionals. The prevalence of unhealthy habits are not for want of desire, however -- a plethora of research shows that fitness perennially remains one of the most common New Year's Resolutions³, yet carrying through with these ambitions is challenging. A 2007 survey found 35% of resolutions are broken by the end of January, and 77% are broken by the end of the year⁴.

Further compounding this issue, exercising alone in a gym results in a lack of accountability or companionship. This was a recurring theme in our user research and a significant hurdle to reaching fitness goals.

Tagalong: A Proposed Solution

The First Step

Despite the many “social” applications out there, many of them (like Strava) are like social networks grafted onto a fitness tracker. The truth is, the hardest part of exercising can often be taking the first step. This project lowers the barrier to creating a fitness habit by creating a casual, commitment-free environment to exercise with real friends.

Habit formation

Additionally, once the threshold for a single activity has been crossed, Tagalong encourages habit formation. The app visualizes a user's streak of consecutive “tagalongs”, using an ongoing streak as a means of motivation. Additionally, the app allows users to record messages to themselves to be viewed prior to their next activity. Motivation is highest immediately after successfully exercising, and may be low prior to starting another activity, and the recorded message allows users to bridge that motivational gap. Tagalong draws on the affordances unique to the mobile device, such as location information and the ability to intervene at the moment of decision.

Research

Defining the Target Users

¹ 2009-2010 Survey, <http://www.niddk.nih.gov/health-information/health-statistics/Pages/overweight-obesity-statistics.aspx>

² U.S. Department of Agriculture. Dietary Guidelines for Americans, 2010. Available at: <http://www.cnpp.usda.gov/dietaryguidelines.htm>

³ Nielsen, <http://www.nielsen.com/us/en/insights/news/2015/2015s-top-new-years-resolution-fitness.html>

⁴ Reuters, <http://www.reuters.com/article/2007/12/18/idUS132935+18-Dec-2007+BW20071218>

Our group began with a desire to work in the fitness space; however, fitness is an especially broad and crowded industry with a wide variety of topics. Initial ideas targeted a wide variety of user groups, ranging from elite athletes, to injured athletes undergoing rehab, to people with no regular fitness habits.

Our team decided that we wanted to focus on improving the fitness habits of those who did not have regular exercise habits, rather than focusing our attention on injured athletes undergoing rehab or consistent athletes. Conversations with some potential users and physical therapists revealed that injury rehabilitation is a very nuanced and patient-specific process that made a general technical solution challenging to design. We wanted not only to create a system that met certain users' needs and use cases, but also improved their well-being.

Existing Solutions

A plethora of information systems and technical applications have been created for fitness with a variety of operating assumptions and principles.

Many fitness applications are focused on tracking activities and quantified self. For example, apps such as Strava and RunKeeper are used for tracking runs and bike rides using GPS-enabled devices. Strava also focuses on using competitive features to motivate their users to try to improve their rank on their segments. Social networks and interactions exist on these networks but are limited to viewing, commenting, and comparing others' activities.

There is also another class of fitness-related services such as FitMob and Fitocracy that are geared around finding offline, real-world groups to exercise with. These apps operate on the assumption that social relationships and exercising in groups is key to motivation and building fitness habits.

Exploratory Research

To better narrow down our focus, we conducted interviews with a variety of people, ranging from those who never exercised at all, to regular runners and triathletes. These were mostly unstructured interviews, with the main goal of understanding personal and interpersonal exercise routines, as well as motivations for exercising. Some examples of topics and questions that were discussed in these interviews included:

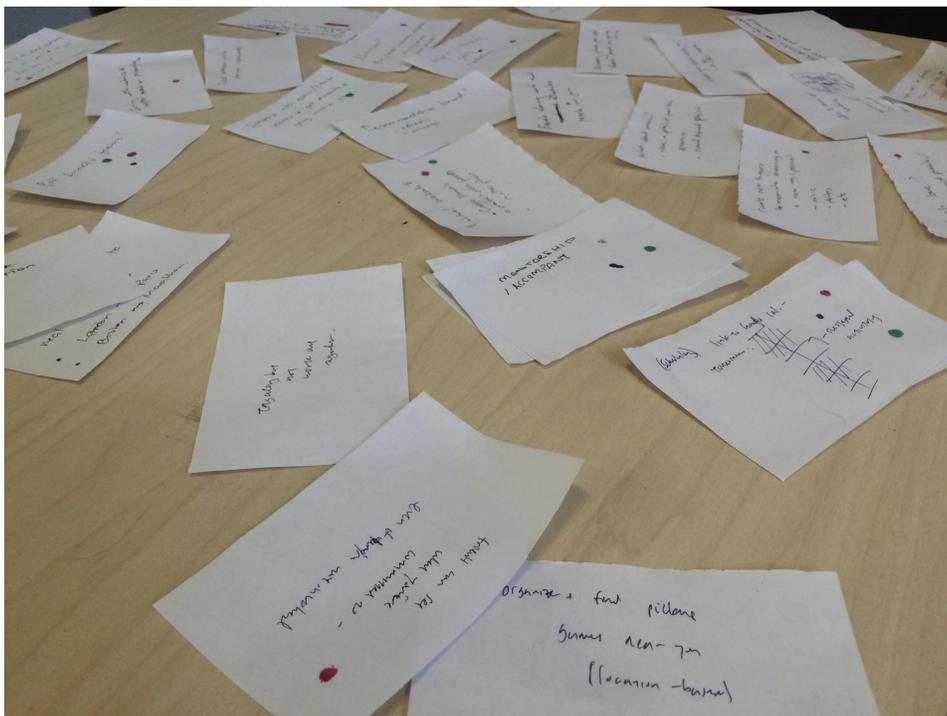
- How regularly do you exercise? How regularly would you like to exercise?
- What type of exercise do you do?
- Do you have a gym membership? How often do you go?
- Why do you exercise? What's your goal?
- Describe a time when you were really motivated for a workout.
- How do you feel about exercise? Do you look forward to it?
- Do you exercise with others? Are you comfortable exercising in a group setting or with other people? Do you feel comfortable doing exercise with people you do not know?
- Are you comfortable working out with those of different ability or skill level than you?

Key Findings

This round of research shed light on many difficulties in reaching fitness goals. A recurring theme was that accountability and camaraderie was a key factor in keeping a person engaged in their goals. Some people intentionally sought out structure and accountability in the form of gym classes, whereas others anecdotally found that they were more likely to carry through with their exercise plans when social expectations and accountability were involved.

This diversity of experiences also highlights another finding: a variance in preference for commitment. Formal gym classes were too structured for some -- the people we interviewed wanted a mechanism to find a system that worked for them, rather than necessarily having a structure forced on them.

An affinity diagram was used to compile and organize the interview findings into overall themes.



The findings from the affinity diagram were used as input into brainstorming systems to design for the application.



Literature Review

Since we were dealing with tackling habit formation, we were attracted to the notion of conducting a thorough literature review of psychology and behavior economics journals. Before embarking on this quest we sought guidance from our advisor Professor Steven Weber who recommended a different take on literature review. We were advised that applicable research in the field of habit formation was very scarce and context specific. Moreover, the value we could derive out of such an undertaking was questionable considering that we had very limited to time to unearth, critique and apply relevant theories. Hence, we decided to look at principles that were being employed by popular habit formation applications. We found BJ Fogg's model of behavior⁵ being the most widely adopted by such applications. His model can be simplified as:

Behavior = Motivation + Ability + Trigger

In short, it states that any kind of behavior is reliant on motivation (the will to do something), ability (we don't do something when it seems too difficult) and triggers (we don't do things when we forget)

Other principles that were frequently used by behavior forming applications:

Streaks and visualization: Many popular apps like Strava, Fitbit, up and myFitnesspal relied on visualizing a chain of achievements as a form of motivation. The idea is based on the belief that we are naturally inclined to get

⁵ <http://www.behaviormodel.org/>

invested in preserving continuity of a streak and would go out of our way to prevent that streak from breaking.

Investing/Accountability: based on the belief that we are more likely to do something if we are beholden to somebody to do it, and we've invested something (money, pride, etc.) on our completion.

Goals: relies on the idea that people work best in the context of a meaningful goal and motivated by measurable achievement in pursuit of that goal.

Additionally, we realized that the following behavioral economics principles were highly relevant for developing our application:

Intertemporal choice: The struggle and inconsistency in our preferences at different points in time.⁶

This principle helps us explain why so many people we surveyed talked about planning to exercise but never being able to actually do it. Simply put, our tendency to be optimistic about our future enables us to downplay the cost of exercising in the distant future but as time progresses and the time to exercise comes closer we suddenly realize the real costs making it very difficult to follow through on our past preferences.

Experiencing self vs. remembering self: Our bias towards memories rather than experience is another factor that contributes to our difficulty in forming exercising habits. In our interviews we uncovered that exercise, especially in a gym, is a fairly routine activity and does not contribute heavily in terms of forming memories. The experience after finishing an exercising session is quite exhilarating. Many of our interview participants talked about how they frequently felt that they should be exercising regularly once they made that once in a while trip to the gym. However, since this thought is primarily born out of the experience, the lack of associated memories leads us into slipping from our initial convictions.

Quantitative Survey

To obtain another angle on our potential users, we also created a quantitative survey. This survey allowed us to get a higher-level view of our demographic, as well as reach a larger group of people than we could with our interviews. The survey is reproduced in the appendix.

Key Findings

The survey was posted to through our various networks (such as Facebook and school email lists), and 165 people responded to our survey.

- 68% enjoy exercising with others (with 18% preferring it)
- 65% of people were "Comfortable" or "Very Comfortable" exercising with their friends (23% Neutral)
- Only 52% of people were "Comfortable" or "Very Comfortable" exercising with strangers (26% Neutral)
- 46% indicated a lack of discipline and accountability as a factor for not exercising
- 63% were comfortable sharing exercise schedules with friends, and an additional 31% comfortable doing so on a case-by-case basis

These findings shed some light and validated some key ideas that undergird the project. For example, the survey underscored the importance of accountability and camaraderie in exercising, a recurring theme from our interviews. The willingness to exercise in groups and sharing schedules with friends was also a helpful validation. Finally, the

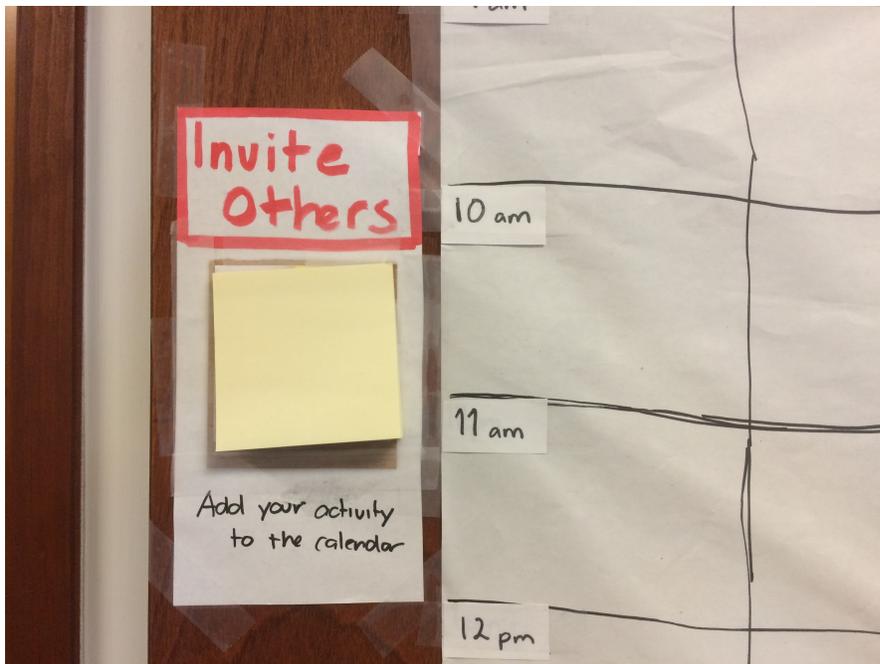
⁶ Thomas Schelling, "The Intimate Contest for Self-Command," <http://learning.hccs.edu/faculty/robert.tierney/phil1301/substantive-course-content/final-essay/thomas-schelling-the-intimate-contest-for-self-command>

Second Experiment: Analog Tagalong chart

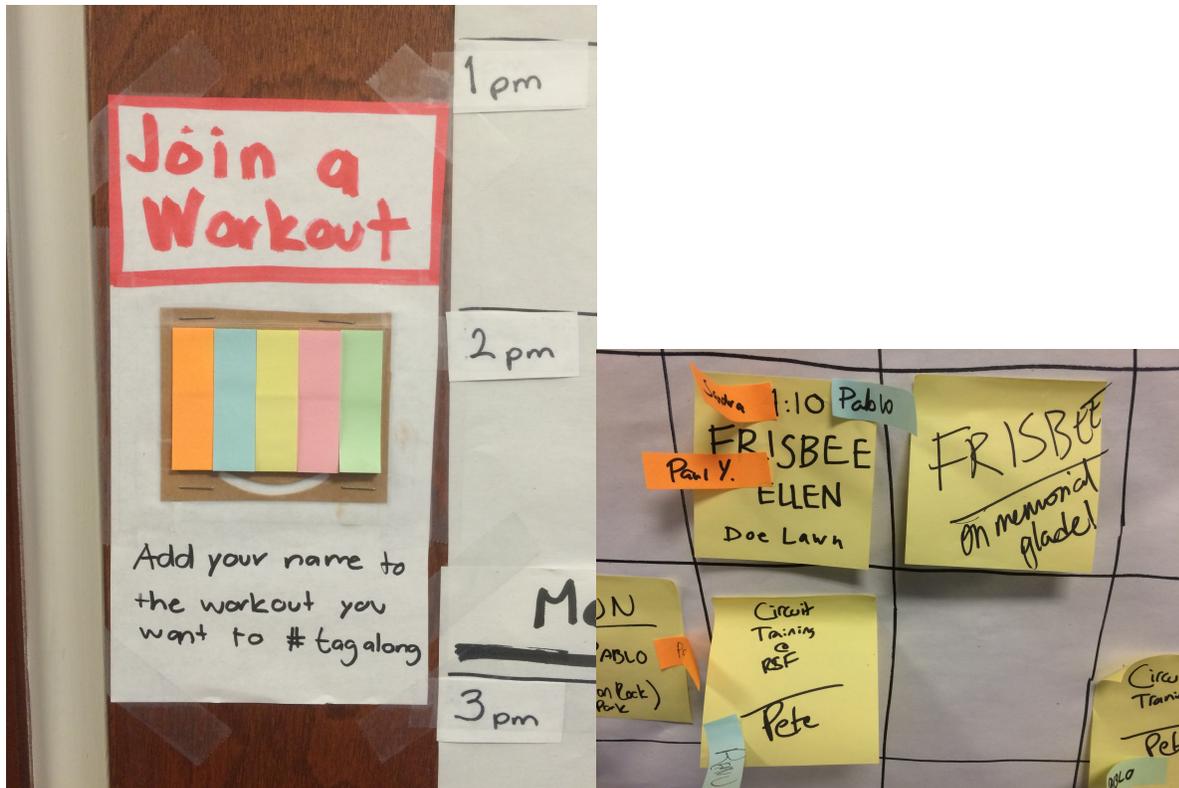
For the second experiment we created a physical chart, which we posted on the wall in the I School lounge. The chart was designed to show a week's view of a calendar. Using sticky notes users posted the exercise activities that they were partaking in, on the chart and other people could tagalong using sticky note tabs as illustrated below.



Tagalong chart



Events were written on sticky notes and attached to the chart



Sticky note tabs were used to indicate a desire to tag along with an activity, and attached to the event note.

Results of experiments, Lessons Learned

Hypothesis Tested	Validated
People are willing to share their exercise activities	Yes
People will tagalong activities if they know when and where their friends are exercising	Yes
People will continue to share or come back to look for more activities to tagalong	Yes
Recording a message describing how one is feeling after exercising can motivate during the moments of doubt	Partially

Third experiment: Contextual Inquiry

While conducting the interviews we realized that our work had so far been unable to reveal the motivations and reasons behind habit formation. We were unable to grasp why certain people exercised regularly while others could not, even when they wanted to.

We also had some doubts around, if and why would regular exercisers be willing to allow others to join their activity. Hence, in order to try and address some of these concerns one of our team members did a three-month contextual inquiry.

The inquiry consisted of utilizing the analog experimental setup mentioned above in the report and using existing communication channels to tag along with regular and non-regular exercisers. In the duration of those three months, our team member participated in 30+ activities with several students of the I School. The activities ranged from hiking, running, swimming and circuit training to playing frisbee.

Results and lessons learned

- Channel factors play the most important role in determining how regular a person is in exercising. People who exercise regularly have systems in place, which allow them to exercise with minimal planning. For instance, runners have their shoes and running gear in their locker and swimmers store their gear at the pool.
- In contrast, people who want to exercise regularly but fail to do so tend to rely in meticulous planning and pack their gear the night before they plan to exercise
- Another important factor was that people who exercise regularly have a more flexible schedule; they adapt according to circumstances but try and get their exercise in as much as possible. They had a goal in terms of the number of times they want to exercise in a week, but they did not plan specific day or time they wanted to exercise.

In contrast, people who failed to exercise regularly planned with great detail and were disappointed when they had to sacrifice their exercise when the schedule did not workout, feeding the belief that they do not have enough time.

Tagalong Concepts

Ad-Hoc Exercise Groups

Many applications and services are already built around the idea of finding and committing to formal classes and programs. Tagalong, on the other hand, is built around exercise groups organized ad-hoc around real-life friends on a week-to-week basis. Habits cannot be formed without the first step being taken, so Tagalong strives to lower the barrier to a single activity as much as possible. These groups change from activity to activity because they are driven by the need and preferences of the different users. The overall goal by itself is not to create formal groups with a strict schedule but to present the users with multiple alternatives in the form of their friend's exercise schedules.

Habit-Formation using Streaks and Visualization

Once a single activity has been started, Tagalong also visualizes streaks to motivate a user to form a habit. The app shows how many consecutive tagalongs have been accomplished, and compares it with the user's personal best, motivating them to improve themselves. Visualizing streaks allows a user to see patterns and take advantage of a competitive spirit and loss aversion, without the potentially discouraging results of comparing a user to other, more athletic peers. Employing behavioral principles such as loss aversion and need to see patterns.

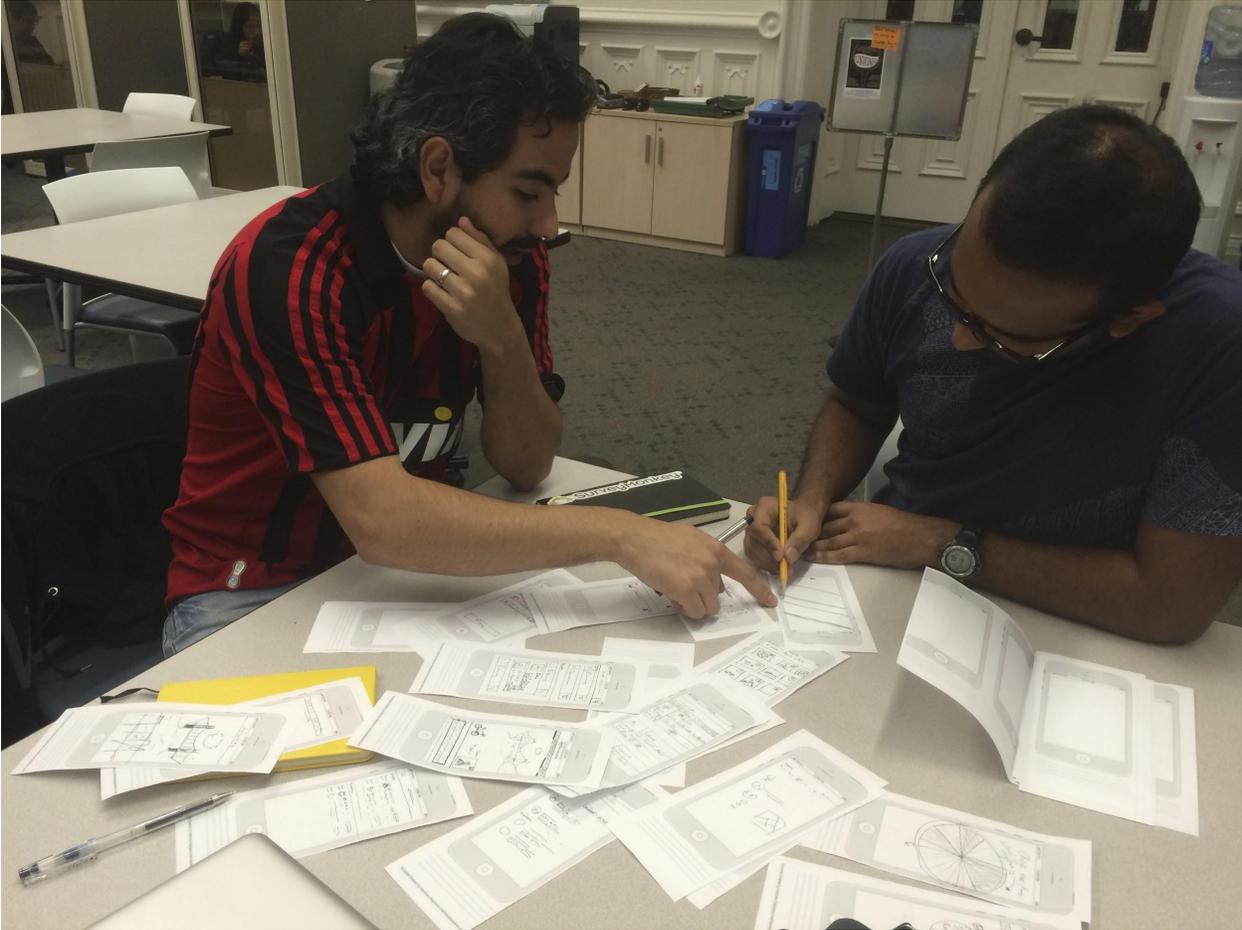
Building Self Motivation

The severe decline of motivation over time is a major barrier to the development of fitness habits. Motivation tends to be extremely high immediately after a workout, and may be extremely low shortly before the next. After an activity, Tagalong prompts a user to record a message to their future selves. This allows a person to capture how they are feeling at a moment of triumph when it is most salient, and transfer it to the time they need it most. By showing such message before the next activity, users can remember the way they felt at the moment they successfully finished exercising and trigger the motivation to get that feeling again. Instead of having a professional coach or a friend trying to motivate them, it is actually their own past selves doing it. This, we believe, can trigger a positive cycle instead of using negative tactics like money loss or public shaming like other products do.

Design Process

Paper Prototypes

After the general idea was formulated, paper sketches of our idea were developed. These involved a variety of layouts and information architecture in order to explore a wide gamut of ideas.



Some ideas involved an image-heavy “activity detail” screen to infuse the app with a friendly personality. Others explored novel interaction and navigation patterns.

After sharing these ideas with others in the group, we further refined them and created paper prototypes, which we tested with 6 participants.

Here are some key findings from the paper prototype tests:

- Right off the bat, we found that users wanted to access the main functionality of the application as soon as possible. In the paper prototypes users had to first fill out a preference form and indicate their availability for the week.
- It also became apparent that users were extremely wary of spamming their friends with invitations to tagalongs. The prototypes were designed such that invitations could be sent to people via instant messaging or any channel they prefer. However, it became evident that users were not convinced about proactively inviting their friends.
- In order to facilitate smarter recommendations, the prototype asked for feedback after a user tagged along with someone. However, we realized that the phrasing of the feedback form was ambiguous and people were wary about filling it since they felt they were reviewing their friends instead of the activity itself.

Interactive Wireframes

With general sketches in hand, our team then turned to tools like Sketch and Invision to create an interactive prototype. Sketch is a vector-based prototyping tool for rapidly creating digital wireframes, which we used to create each major screen in our interaction flows. These were low-fidelity, in monochrome and without focusing on visual design. We then exported these wireframes into images, and constructed interaction flows using Invision, a web-based tool.

Link to the interactive prototype: <http://invis.io/2A2GWZLRU>

After creating these interaction flows, we tested these prototypes with six potential users, focusing on accomplishing key tasks and the ease of use:

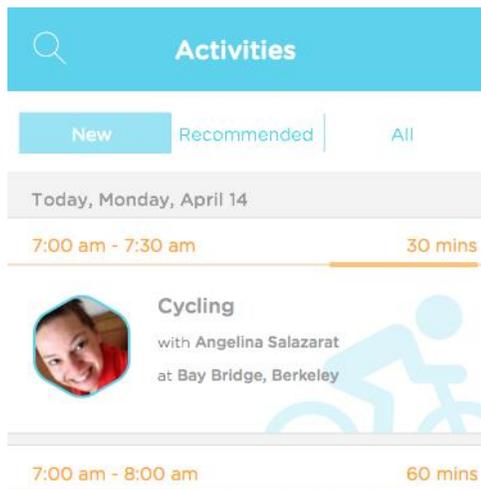
- Creating an account and finding an activity to tag along
- Respond to an activity reminder prior to the activity
- Give feedback to the app after tagging along on an activity
- Create an activity and invite others

Important findings from these tests:

- Testing with low fidelity prototypes revealed that there was a specific hierarchy and order of thought while creating or assessing an activity. Users first thought of the type of activity, the time and duration and then the location.
- It was also noted that users prefer to see member's profile pictures besides the activity they initiated, instead of just the activity icons and noted that this made the application feel "more personal".
- While creating a new activity the users wanted to know if there were similar activities at around the same time and place which they could join, rather than creating a new activity
- We also observed that the number of people tagging along had significant effects on people's willingness to join the activity. It was revealed that if there were more than 2 people joining an activity users felt less committed and felt their absence will not have significant impact on the activity

High Fidelity Prototype

After testing our interactive wireframes a few times and iterating on them, we proceeded with the visual design of the application.



Establishing visual hierarchy

The mental models and needs of the users we discovered while testing the interactive prototypes informed the visual hierarchy of the application. For instance, we designed the search activities page knowing that time of the activity was the most important factor for the user while making a decision to tagalong, closely followed by activity type, location and creator of the activity. This information hierarchy was encoded using location, color, font size and font weight.

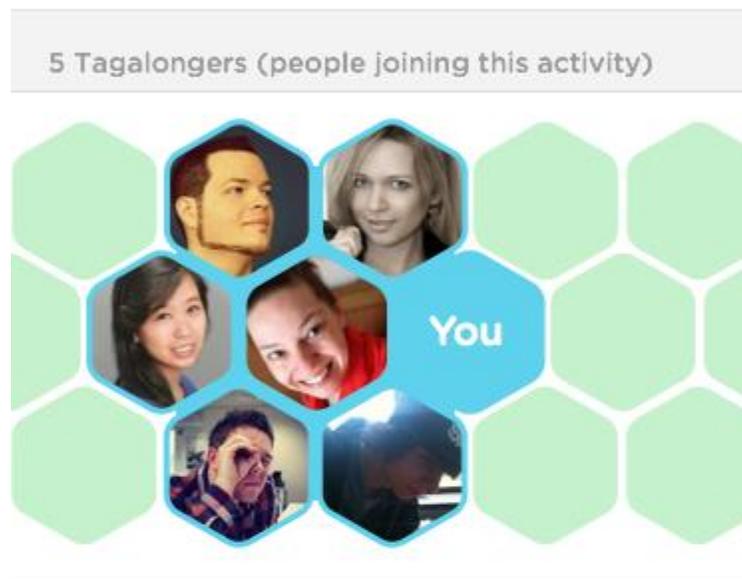
Creating contrast and movement

Tagalong is primarily about creating fitness habits, its about activity and movement. We attempted to denote this spirit of our application by designing and placing the activity icons as if they were moving out of the activity card. This helped us add some character to the application.

Using metaphors to facilitate interactions

We employed the card metaphor to represent an activity as a unit of actionable information. Each activity card was designed to represent all the information necessary to take an action, whether it was choosing an activity to tagalong, viewing upcoming activities or reflecting on past activities.

Next we employed the honeycomb metaphor to denote the primary motivation behind our application. The honeycomb represents the idea that we are stronger together. That everyone has a part to play regardless of his or her expertise or level and that we can get more joy when we are in the company of our friends. Hence, every member is represented in the shape of a hexagon and all the hexagons fit together to create a honeycomb denoting a network of support.



Selecting the color palette

The color palette was primarily derived from the color of honey, water and grass. All natural elements helping us convey a very inviting and refreshing sentiment.

Typography

After many iterations we decided to use Gotham rounded. Gotham is a modern san-serif typeface designed as a more humanistic take on Futura a classic geometric typeface. We selected Gotham rounded to further decrease the cold geometric aspects and accentuate the organic and natural feel of rounded ends.

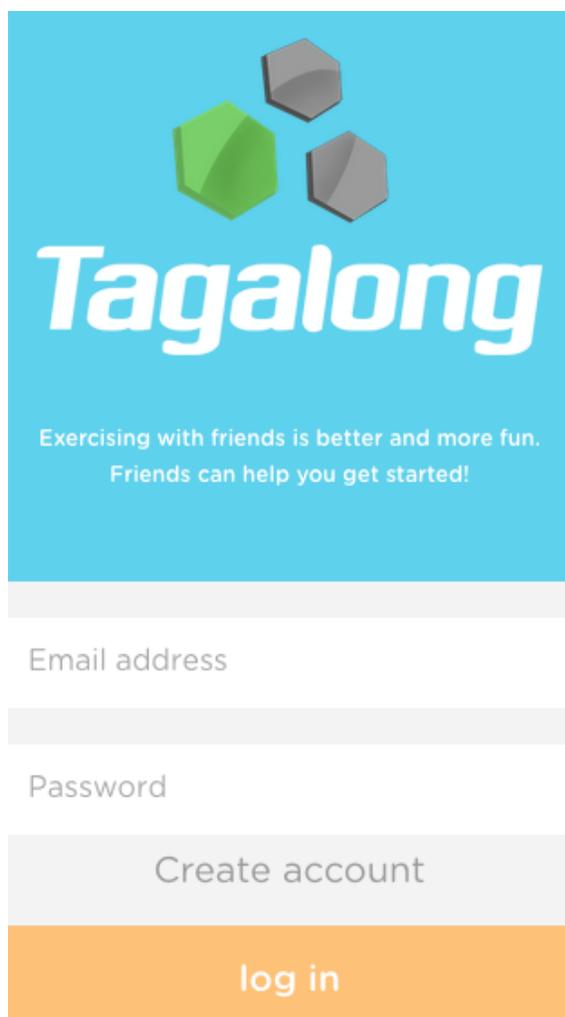
Link to the interactive prototype: <http://invis.io/NU2WS9FDY>

Product Walkthrough

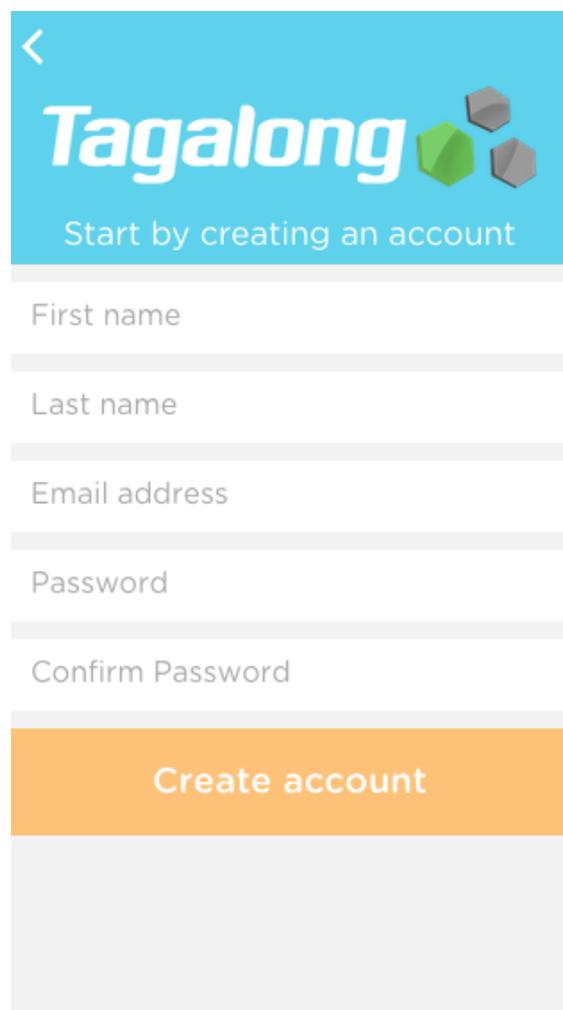
Tagalong enables users to discover and partake in ad-hoc exercise with their friend. The app allows users to create activities, search for new activities, filter activities and specify their exercise preferences, which are then used to recommend activities to join. In addition in app chatting helps users connect more with each removing the need for additional communication platforms for the exercise activities.

User Login

To start tagging along, a user is requested to log into the app if they are accessing the app for the first time or logged out from their session the previous time they used Tagalong. The login page shown below is displayed. If the user does not have an account, they're invited to join Tagalong by selecting Create Account and the Create Account screen on the right is shown.

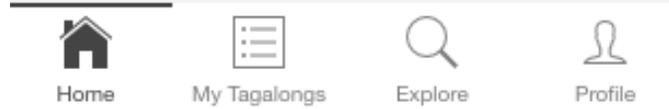


The login screen features the Tagalong logo at the top, consisting of three 3D cubes (one green, two grey) above the word "Tagalong" in a white, bold, sans-serif font. Below the logo is the tagline: "Exercising with friends is better and more fun. Friends can help you get started!". The screen contains two input fields: "Email address" and "Password", both with light grey borders. At the bottom, there are two buttons: a light grey button labeled "Create account" and an orange button labeled "log in".



The create account screen has a light blue header with a back arrow on the left, the Tagalong logo, and the text "Start by creating an account". Below the header are four input fields: "First name", "Last name", "Email address", and "Password", each with a light grey border. A "Confirm Password" label is positioned below the "Password" field. At the bottom, there is a prominent orange button labeled "Create account".

Menu bar



The menu is displayed in the app all the time and gives the user access to the different functions of the app. The current selection is highlighted in addition to having a line over it.

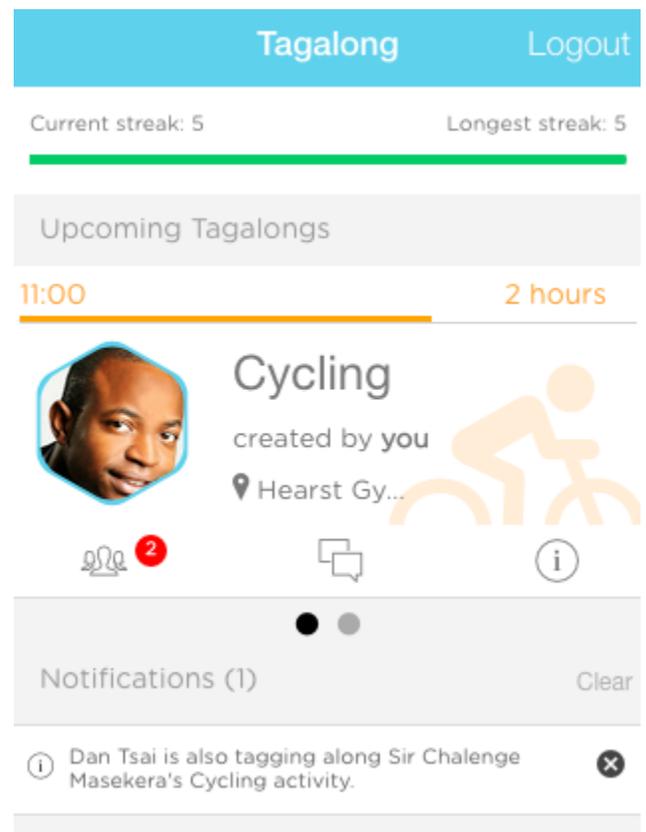
Home

The home page consists of three sections, the user's streak, upcoming activities and notification.

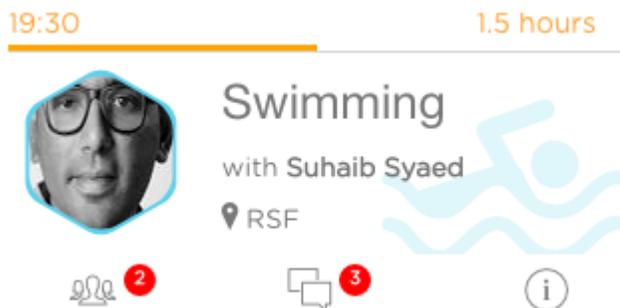
The page acts as a dashboard to the user, letting them know:

- Streaks - how they're doing to maintain habit
- Upcoming activities - what is going to happen
- Notifications - any information that pertains to activities they want to do

Selecting an upcoming activity or a notification takes the user directly to the activity.

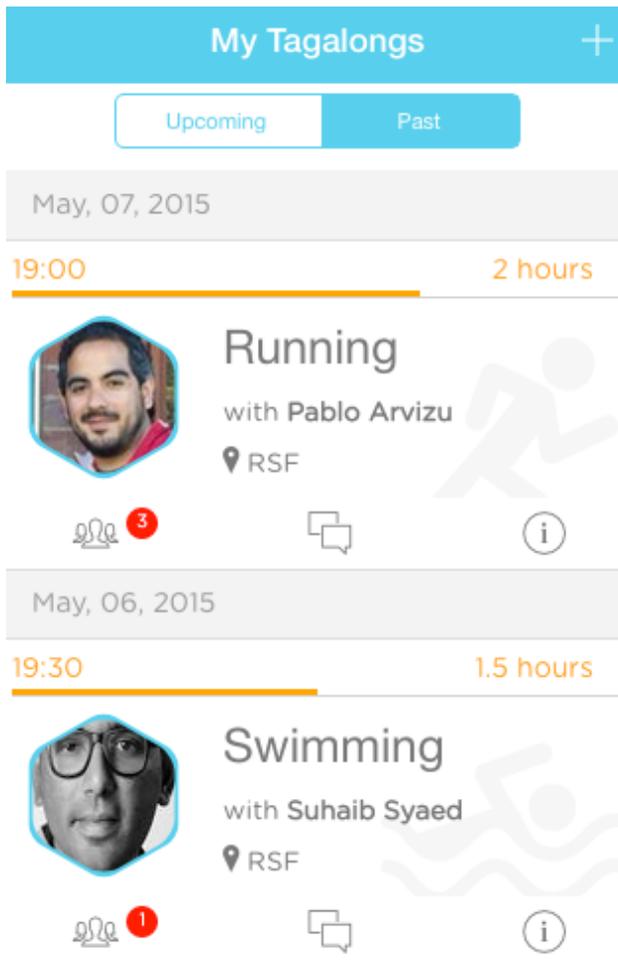


Activity Card



The activity card is a miniature view of an activity that provides a snapshot of the important details of an activity, such as the host of the activity, the activity date, time, location as well as number of people already tagging along the activity. Each card has an icon of that matches the type of activity. Tapping the card will take the user to the Detailed Activity view.

My Tagalongs



My Tagalongs shows activities that the user has either created or tagged along. It has two tabs, one for **Upcoming Activities** and the other for **Past Activities**.

The (+) icon allows a user to create a new activity

With these two tabs a user can alternate views to see **Upcoming activities** that they have created or tagged along or

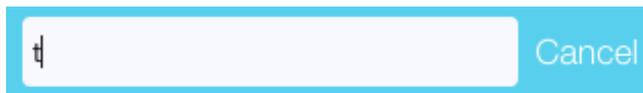
Explore Tagalongs

This is the main page where users can discover activities to tagalong. The page has three tabs that show **New** or recently created activities, **Recommended** activities based on the user's preferences and past tagalongs and **All** activities.

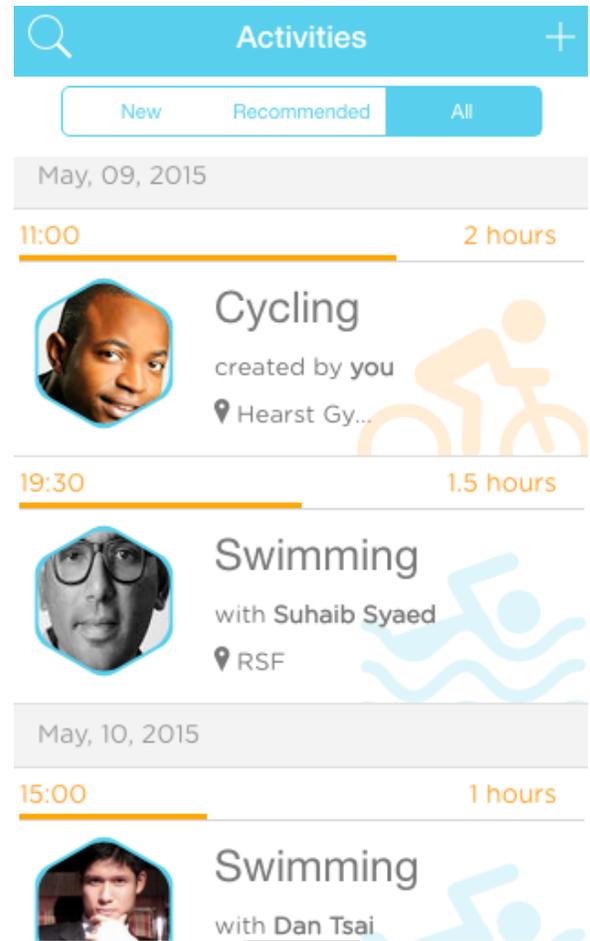
Tagalong has a consistent look across all the pages allowing users, thus also implements the same activity cards in this view also.

From this page a user can either use the search option through the top left icon to filter results.

Searching – Tapping the search icon on the top left of the page provides reactive search functionality filtering results as the user types. It searches across the activity, people and location all in one go as shown below



Search input field with a magnifying glass icon on the left and a "Cancel" button on the right.



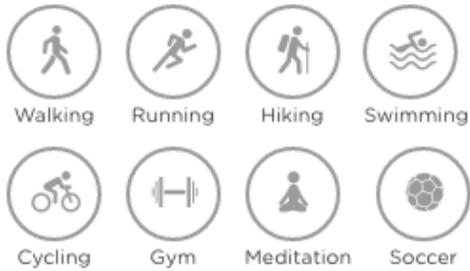
The screenshot displays the 'Activities' page. At the top, there is a search bar with a magnifying glass icon and a plus sign. Below the search bar are three tabs: 'New', 'Recommended', and 'All'. The page is divided into two sections by date: 'May, 09, 2015' and 'May, 10, 2015'. Each section contains activity cards. The first card is for 'Cycling' at 11:00, lasting 2 hours, created by the user at Hearst Gy... The second card is for 'Swimming' at 19:30, lasting 1.5 hours, with Suhaib Syaed at RSF. The third section, 'May, 10, 2015', contains a card for 'Swimming' at 15:00, lasting 1 hour, with Dan Tsai.

Create Activity

A user can select one of the pre-defined activities, the date, time, input the duration, location and comments for the activity. They can also point to the exact location of the activity on the map.

Cancel Create New Activity Save

Select the activities you want to create



The user selects the activity by tapping on one of the icons shown in this page

Select the day and time

F 8	S 9	S 10	M 11	T 12	W 13	T 14
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Time

Duration (hours)

To choose a date of the event, the user taps one of the 7 days of the current calendar week.

They also select the time and duration of the event in this section

Select the location for you activity

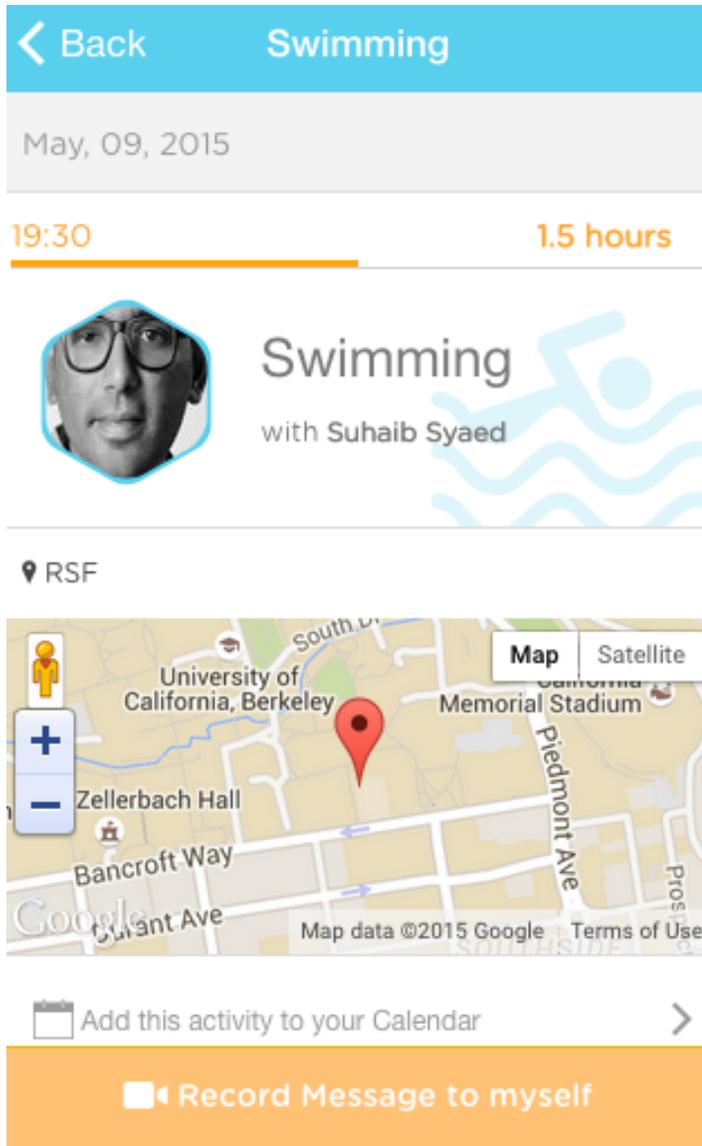
Location name

A map of Berkeley, California, showing streets like Delaware St, Hearst Ave, Berkeley Way, University Ave, Addison St, and Alston Way. A red location pin is placed on the map, and a blue location tag labeled 'Downtown Berkeley' is also visible.

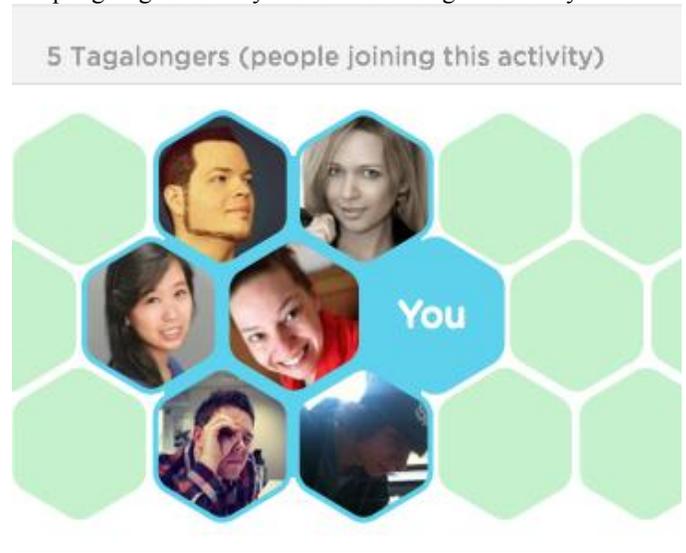
The user specifies the location of where the activity will take place through two ways, first by typing the name of the location then also by pointing the exact position of the location by navigating the map

Detailed Activity View

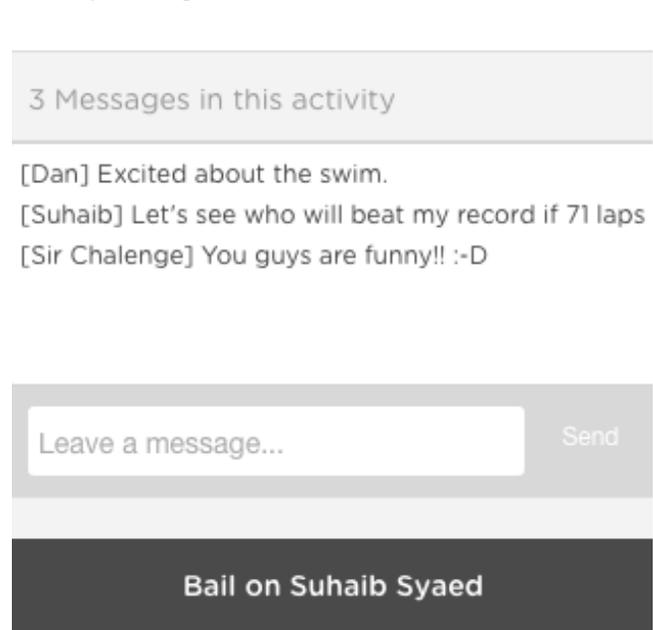
Shows all the details about the including the friend who created the activity, the date and time, location including its exact position on the map and other messages of the activity. This view allows the user to add the activity to their default calendar app. This view also shows the pictures of people who are going to the activity.



People going to activity visualized through the honeycomb



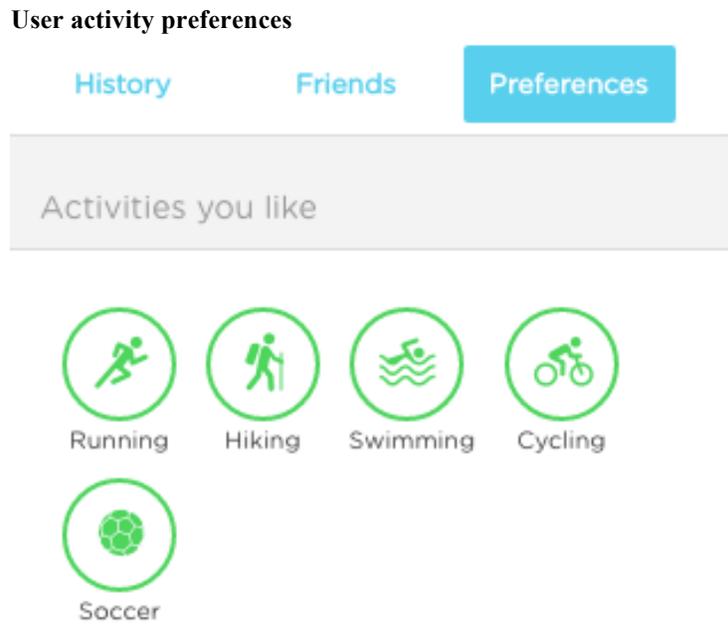
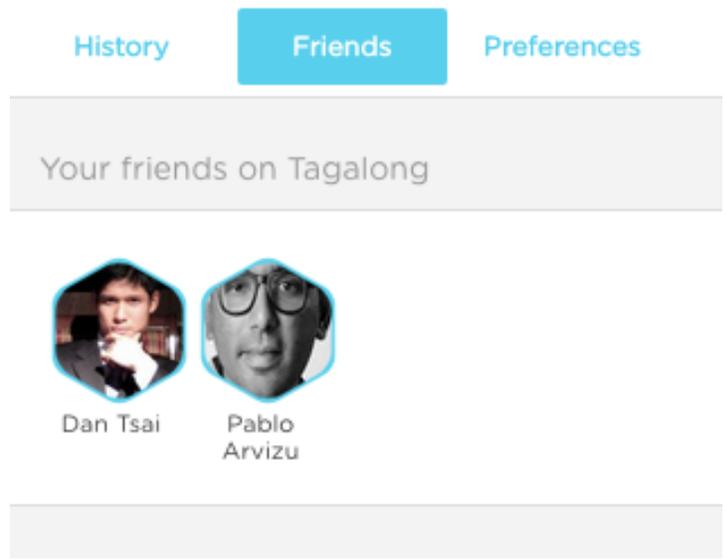
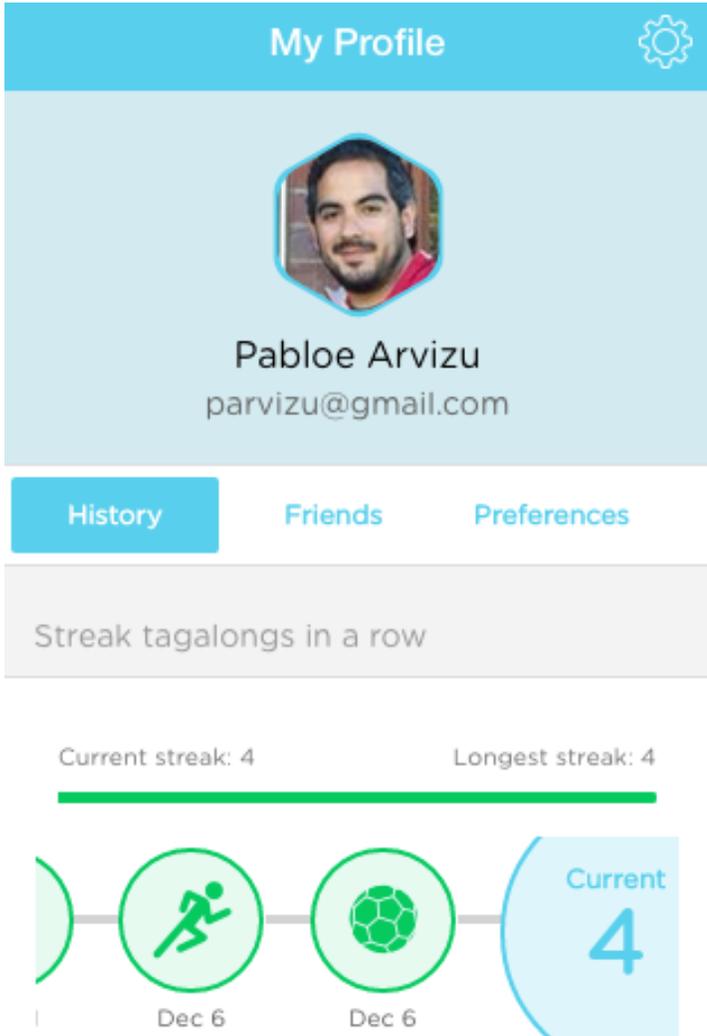
Activity Messages



If the user is not the one who created the activity they are given an option to tagalong with the activity. Users are also presented with an option to record a message to self, to provide motivation to their future self on why they are tagging along. This addresses the time-inconsistency behavioral aspects.

My Profile

The user can access their such as the their tagalong history, their friends and preferred activities. The history shows the user's streak as well as a visualization of the activities they did and whether they went through with them or not. The image on the left shows the default view that displays the user's streak. Images on the right show the display after selecting the corresponding tabs. A user can edit their information from this page by selecting the settings icon at the top right of the screen.



Technical Discussion

To implement Tagalong we used the Meteor.js, Meteoric, Cordova, MongoDB, JavaScript, CSS and HTML. We discuss why we chose to use these frameworks as the backbone of our solution and the merits of implementing using those technologies.

Meteor.js

Meteor is a powerful cross-platform runtime environment built on top of Node.js that is used for building real-time web applications. It consists of a comprehensive and cohesive collection of libraries that enable fast and easy development of web applications that can be turned into fully fledged production apps. We used Meteor as the backbone of the app, thus implemented all the other technologies on top of it.

Meteor Components

Server - consists of a Node.js app that enables communication between the database and browser. The Livequery library in the server streams out data from the MongoDB in a reactive way.

Client - is the browser part of the platform that is the html pages that are rendered and functions that are required to handle events in the browser. The client also has Minimongo, that is client side mongo library that synchronizes data with the server side MongoDB. It also holds the session information

MongoDB - a document database storing all the web application's information.

Considerations for Using Meteor

Easy to use - developing an app using Meteor requires knowledge of only HTML, CSS, and JavaScript. This saves time as opposed to learning a new web development framework or mobile application native languages.

Powerful - Meteor abstracts away many of the usual hassles and pitfalls of web app development with normal tool, proving a solid foundation for a scalable solution.

JavaScript - Meteor uses JavaScript in both the client and server side that allows sharing of code between both environments

Object-oriented framework - the use of JavaScript and Mongo which are both object-oriented unifies the development language and data format (JSON)

Open-source libraries - as an open framework Meteor bring along many libraries such as accounts-ui that can be added into the environment, to handle many functions reducing development time

Reactivity - This was the most important feature in development. Having a reactive data source allow ensures that both data in the server database and client-side database are in sync. This removes the need to constantly check the database for any changes manually. Any changes to the data are automatically updated to anything being shown without having to refresh the page or app.

Integration - Meteor allows integration with other packages such as Cordova bringing functionality for multiple platforms such as iOS and Android with the same code.

Meteoric (Meteor + Ionic)

Meteoric is a mobile front-end framework that custom built for Meteor integration of Ionic. Ionic, is a hybrid framework for mobile web applications that contains an SDK, which replicates native mobile interactions. Meteoric is a framework that leverages Ionic and allows the use of Ionic components using Meteor notation. With Meteoric we were able to build the whole mobile web application as a hybrid for iOS.

Cordova

Cordova is a set of device APIs that allow a mobile app developer to access native device function such as the camera or accelerometer from JavaScript, hence there is no need to learn any native code such as Swift, Objective-C or Java. It thus allows us to use web-standards for cross-platform development, while still leveraging device-native technologies. This also makes any implementation portable to other device platforms with minimal to no changes.

Front-End Development

Using Meteor and Cordova as frameworks allowed most of the development to take advantage of web standards and technologies such as HTML, CSS, and JavaScript.

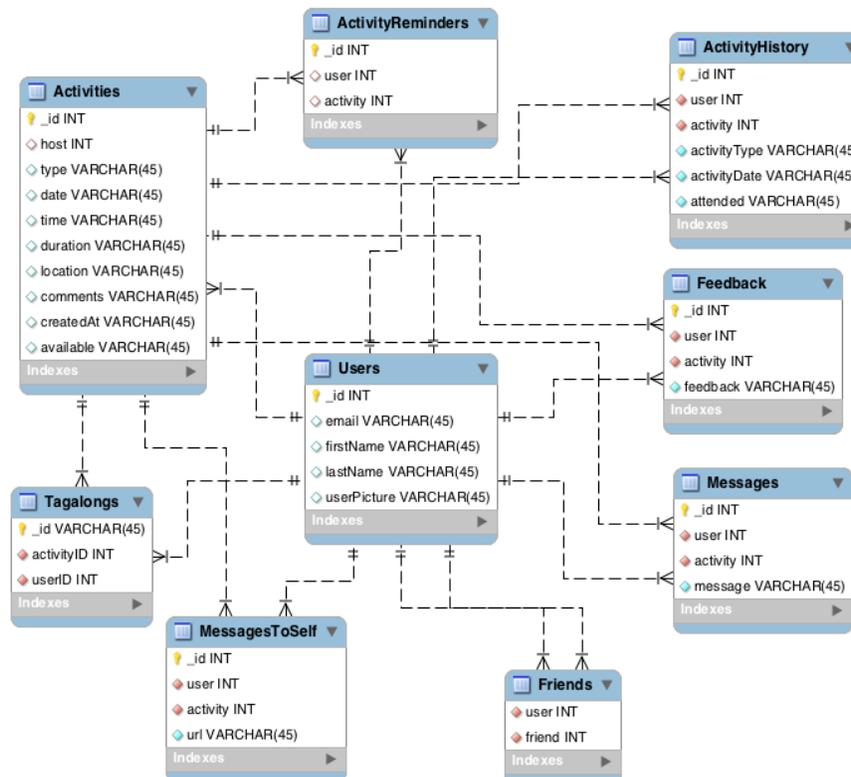
Google Maps API - we also used the Google Maps API to allow users to show the exact activity location

Database Design

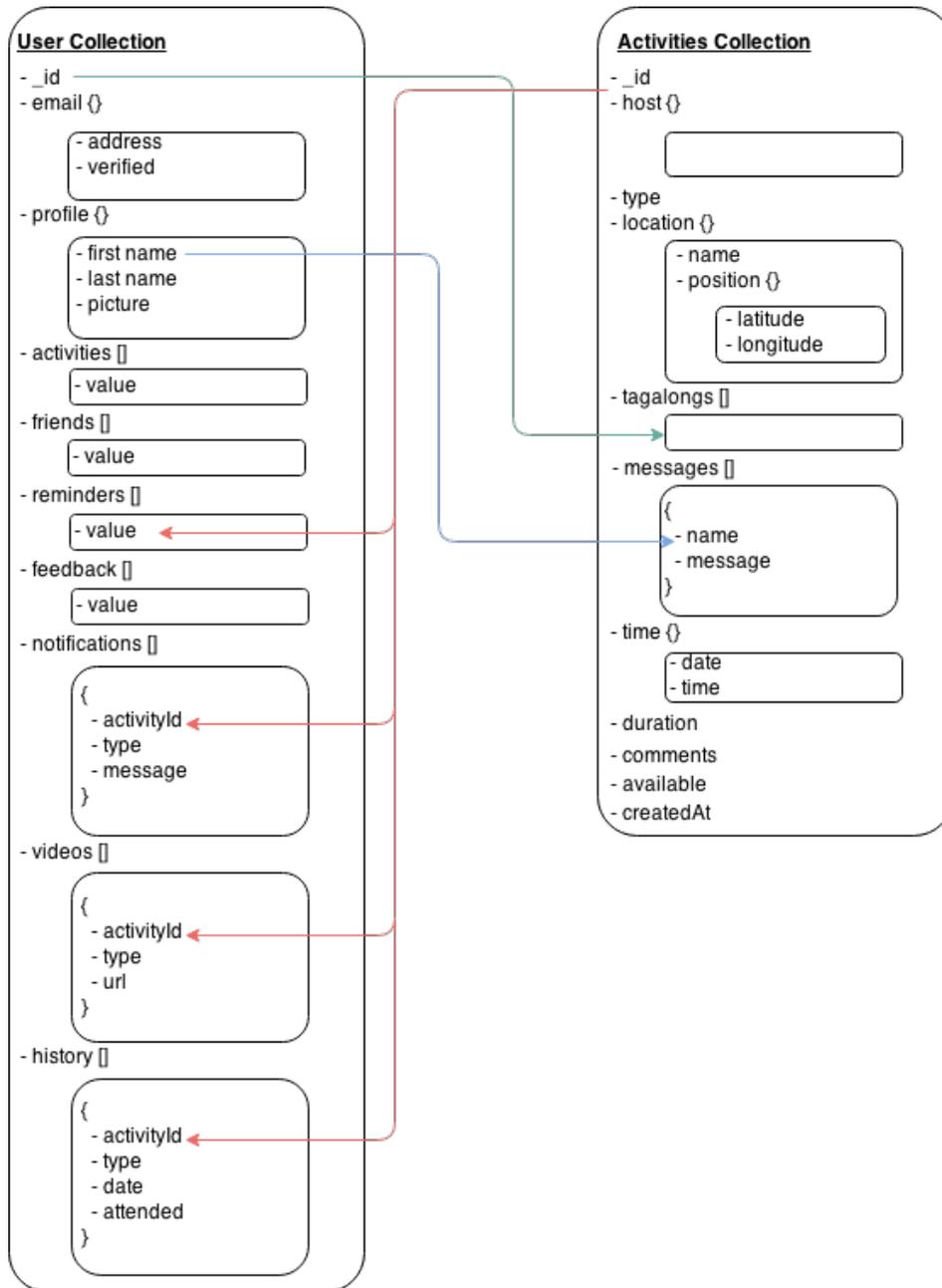
Tagalong is centered on the user and interactions the user has with other users as well as with activities to tagalong. Having denormalized data thus proved key to enabling fast and efficient data access. Additionally having the ability to store data of any structure and dynamically modify the schema, as we developed the system was another factor that played into which data store to use. We thus decided that MongoDB that Meteor natively supports was the best database to use. Mongo DB's document data model makes it easy for to store data focused on a user perspective removing the need to load multiple normalized tables all at once.

The following EER diagram describes the user-centered view from a relational database perspective

Relational View of Underlying Data Model



Document Model View of Database



Next Steps

As a new application, we would like to continue testing the application and gather feedback to understand ways that it works well to facilitate activities, and ways that it falls short. To that end, the initial release will be limited to a focused community (the Berkeley School of Information community) to allow us to gather focused feedback, before opening the application to the broader world.

Before opening the application to all users, we also intend to study the most efficient way to build a friend network within the application. Asking a user to manually select friends works in a small tight-knit community, but may not scale very well.

We also intend to explore other mechanisms for lowering the friction to habit formation. For example, after an activity has happened, we may ask the user to renew an activity and commit to a next activity. This places the commitment decision for exercise at the time when motivation is highest (immediately after exercising).

Conclusion

Developing personal fitness habits is difficult, and can seem an especially daunting task in an individualistic, fast-paced culture. It can be difficult to drum up the motivation to exercise alone, and even more difficult to turn that activity into a habit.

Tagalong was developed through extensive user research and is designed to lower the barrier to exercising and developing fitness habits. By tagging along with real friends doing activities they prefer, without the burden of a formal commitment, Tagalong simplifies the beginning of a fitness lifestyle. We do not believe that Tagalong will be the single solution to this problem and it is not meant for everyone. People have different motivations in regards to exercising. Tagalong is aimed at those who want to live a healthier life but have found it difficult to achieve an improvement in their fitness and health. It is not a tool to be used as a training aid for high performance athletes.

In the end, we understand that no matter the amount of research and innovation in design and development of a solution, in the field of health and fitness, the initial motivation will have to come from the user and it is a personal choice. Tagalong is a tool that we believe can aid and help those who already have that initial motivation and drive.

Appendices

A. Survey Questions

1. What do you most often do for exercise?
 - a. Lift weights
 - b. Walk
 - c. Run
 - d. Hike
 - e. Swim
 - f. Dance
 - g. Aerobics
 - h. Pilates
 - i. Play a team sport
 - j. Other:
2. How often do you exercise?
 - a. Almost every day or more
 - b. Couple times a week
 - c. Few times a month
 - d. Rarely or never
3. How often would you LIKE to exercise?
 - a. Almost every day or more
 - b. Couple times a week
 - c. Few times a month
 - d. Rarely or never
4. Do you prefer to work out in groups, by yourself, or enjoy both?
 - a. By myself
 - b. In groups
 - c. Enjoy both
5. How comfortable are you with exercising together with your friends (e.g., in a group or in a class)? (1=Very Uncomfortable... 5=Very Comfortable)
6. How comfortable are you with exercising together with strangers (e.g., in a group or in a class)? (1=Very Uncomfortable... 5=Very Comfortable)
7. How comfortable are you exercising together with others of different skill/ability levels? (1=Very Uncomfortable... 5=Very Comfortable)
8. What are some reasons you do not exercise more than you do currently? (Check all that apply)
 - a. I am content with the amount of exercise I currently do
 - b. I don't know how to exercise properly
 - c. I don't have enough time to exercise more
 - d. I don't have anyone to exercise with and I don't want to exercise alone
 - e. I don't have exercise facilities/location close to where I stay
 - f. I don't have the discipline or have someone to keep me accountable to exercise
 - g. I don't have the right equipment or gear
 - h. Other (please specify)
9. Is your workout schedule consistent/regular?
 - a. Yes
 - b. No, my workout schedule is variable

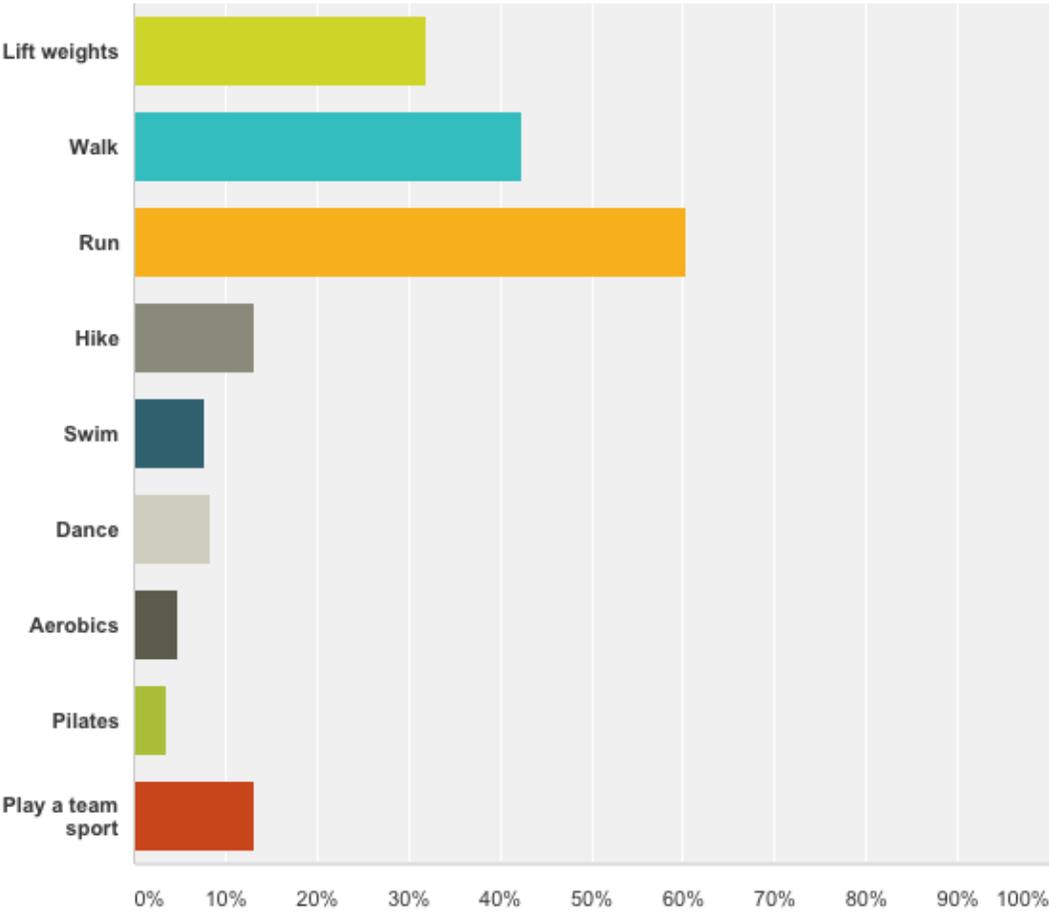
10. Are you comfortable with sharing your exercise schedule with your friends?
- a. Yes
 - b. No
 - c. Case-by-case basis

Selected Survey Results

Q1

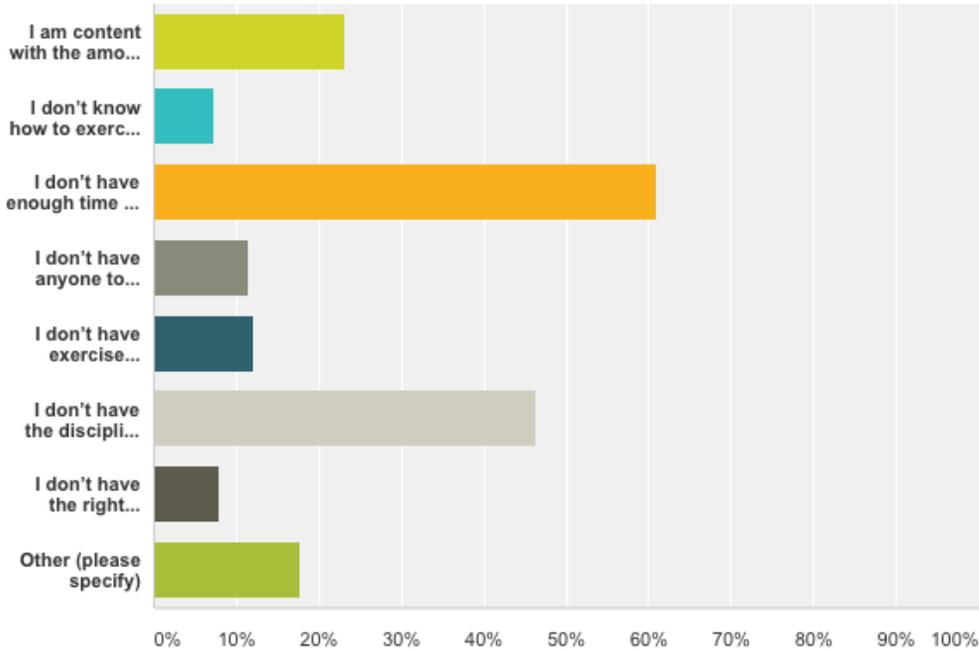
What do you most often do for exercise?

Answered: 144 Skipped: 20



What are some reasons you do not exercise more than you do currently? (check all that apply)

Answered: 164 Skipped: 0

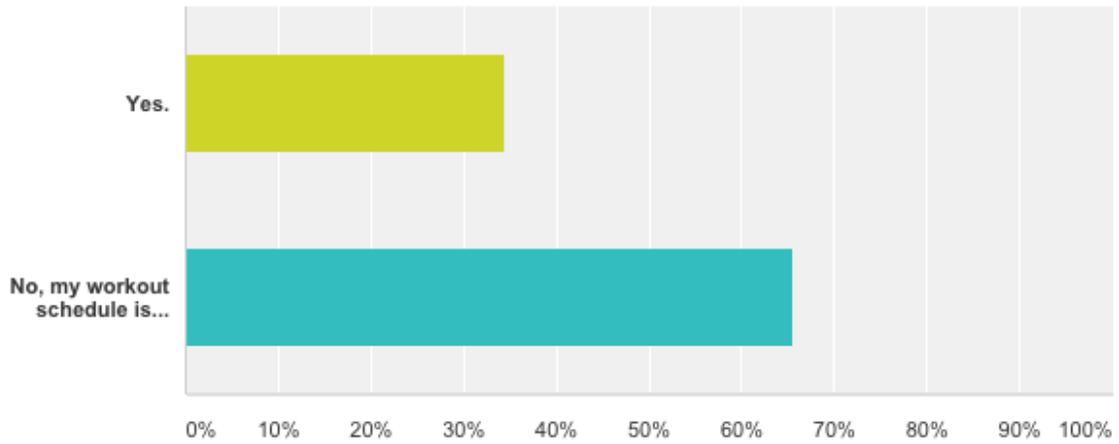


Answer Choices	Responses
I am content with the amount of exercise I currently do	23.17% 38
I don't know how to exercise properly	7.32% 12
I don't have enough time to exercise more	60.98% 100
I don't have anyone to exercise with and I don't want to exercise alone	11.59% 19
I don't have exercise facilities/location close to where I stay	12.20% 20
I don't have the discipline or have someone to keep me accountable to exercise	46.34% 76
I don't have the right equipment or gear	7.93% 13
Other (please specify) Responses	17.68% 29
Total Respondents: 164	

Q9

Is your workout schedule consistent/regular?

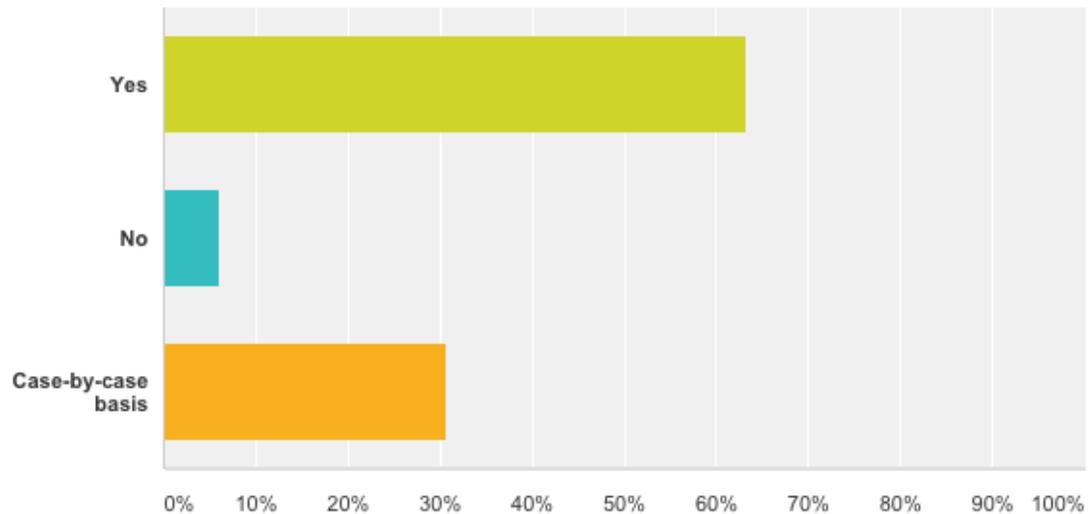
Answered: 163 Skipped: 1



Q10

Are you comfortable with sharing your exercise schedule with your friends?

Answered: 163 Skipped: 1



Taxonomy Outline

```
Activity = {
  "_id": "cguwkG6u8utFK8xCX",
  "host": {
    "_id": "zbXtjq2Evr2ymC4ew",
    "name": "Suhaib Syaed"
  },
  "type": "Swimming",
  "location": {
    "name": "RSF",
    "position": {
      "A": 37.86975679515367,
      "F": -122.25605652537841
    }
  },
  "time": {
    "epoch": "",
    "date": ISODate("2015-05-10T02:30:00Z"),
    "time": "19:30"
  },
  "tagalongs": [
    "BFvTf2JCqbRgiCshX",
    "Sp5cuPWAqdkMjwTbe"
  ],
  "messages": [
    "[Dan] Excited about the swim.",
    "[Suhaib] Let's see who will beat my record if 71 laps",
    "[Sir Challenge] You guys are funny!! :-D"
  ],
  "duration": "1.5",
  "pictures": [],
  "status": "Available",
  "invitations": [],
  "public": true,
  "comments": "",
  "createdAt": ISODate("2015-05-05T06:14:32.536Z"),
  "available": true
}
```

```
User = {
  "_id": "BFvTf2JCqbRgiCshX",
  "services": {
    "password": {
      "bcrypt": "$2a$10$yEkxIZZfYBrE9bS8Xu0zC.P7fMjKU0tuR3nyN5HfAPagEE5likePC"
    },
    "resume": {
      "loginTokens": [
        {
          "when": ISODate("2015-05-07T07:22:24.593Z"),
          "hashedToken": "87EPNxe6rh9PeLUvqvjuOGJtdyguDURZUyn1UeweRoY="
        }
      ]
    }
  },
  "emails": [
    {
      "address": "challenge@gmail.com",
      "verified": false
    }
  ]
}
```

```

    }
  ],
  "profile" : {
    "names" : {
      "first" : "Sir Challenge",
      "last" : "Masekera",
      "pic" : "/img/Challenge.jpg"
    }
  },
  "activities" : [
    "Walking",
    "Running",
    "Hiking",
    "Swimming",
    "Cycling",
    "Gym",
    "Meditation",
    "Soccer"
  ],
  "friends" : [
    "Sp5cuPWAqdkMjwTbe",
    "p5sKnZEPTDFpTNxey",
    "zbXtjq2Evr2ymC4ew"
  ],
  "notifications" : [
    {
      "message" : "Dan Tsai is also tagging along Suhaib Syaed's Swimming activity.",
      "type" : "tagalong",
      "_id" : "cguwkG6u8utFK8xCX"
    },
    {
      "message" : "Suhaib Syaed is tagging along your Gym activity.",
      "type" : "tagalong",
      "_id" : "WR5ChMQYojGfLjkJr"
    }
  ],
  "feedback" : [],
  "reminders" : [],
  "videos" : [],
  "history" : [
    {
      "_id" : "cguwkG6u8utFK8xCX",
      "type" : "Swimming",
      "date" : ISODate("2015-05-10T02:30:00Z"),
      "attended" : true
    },
    {
      "_id" : "c5ghQXnhmpWBemPsh",
      "type" : "Soccer",
      "date" : ISODate("2015-05-06T20:20:17Z"),
      "attended" : true
    },
    {
      "_id" : "awgmLHnDt5YCbC7kB",
      "type" : "Meditation",
      "date" : ISODate("2015-05-06T20:16:39Z"),
      "attended" : true
    },
    {
      "_id" : "awgmLHnDt5YCbC7kB",
      "type" : "Meditation",

```

```

    "date" : ISODate("2015-05-06T20:16:39Z"),
    "attended" : false
  },
  {
    "_id" : "zGeEzTTn5y4dAJ3xo",
    "type" : "Running",
    "date" : ISODate("2015-05-06T20:10:19Z"),
    "attended" : false
  },
  {
    "_id" : "2f3ttYTwjCPBnguu",
    "type" : "Running",
    "date" : ISODate("2015-05-06T19:57:21Z"),
    "attended" : true
  },
  {
    "_id" : "yGXTv2WRM8KkBvL5w",
    "type" : "Soccer",
    "date" : ISODate("2015-05-06T19:48:01Z"),
    "attended" : true
  },
  {
    "_id" : "g2EcNMoeHbcjrpJzA",
    "type" : "Meditation",
    "date" : ISODate("2015-05-06T19:42:38Z"),
    "attended" : false
  },
  {
    "_id" : "WR5ChMQYojGfLjkJr",
    "type" : "Gym",
    "date" : ISODate("2015-05-06T19:40:24Z"),
    "attended" : true
  }
]
}

```