Improved KilojouleCounter

CSC2002S Assignment 2

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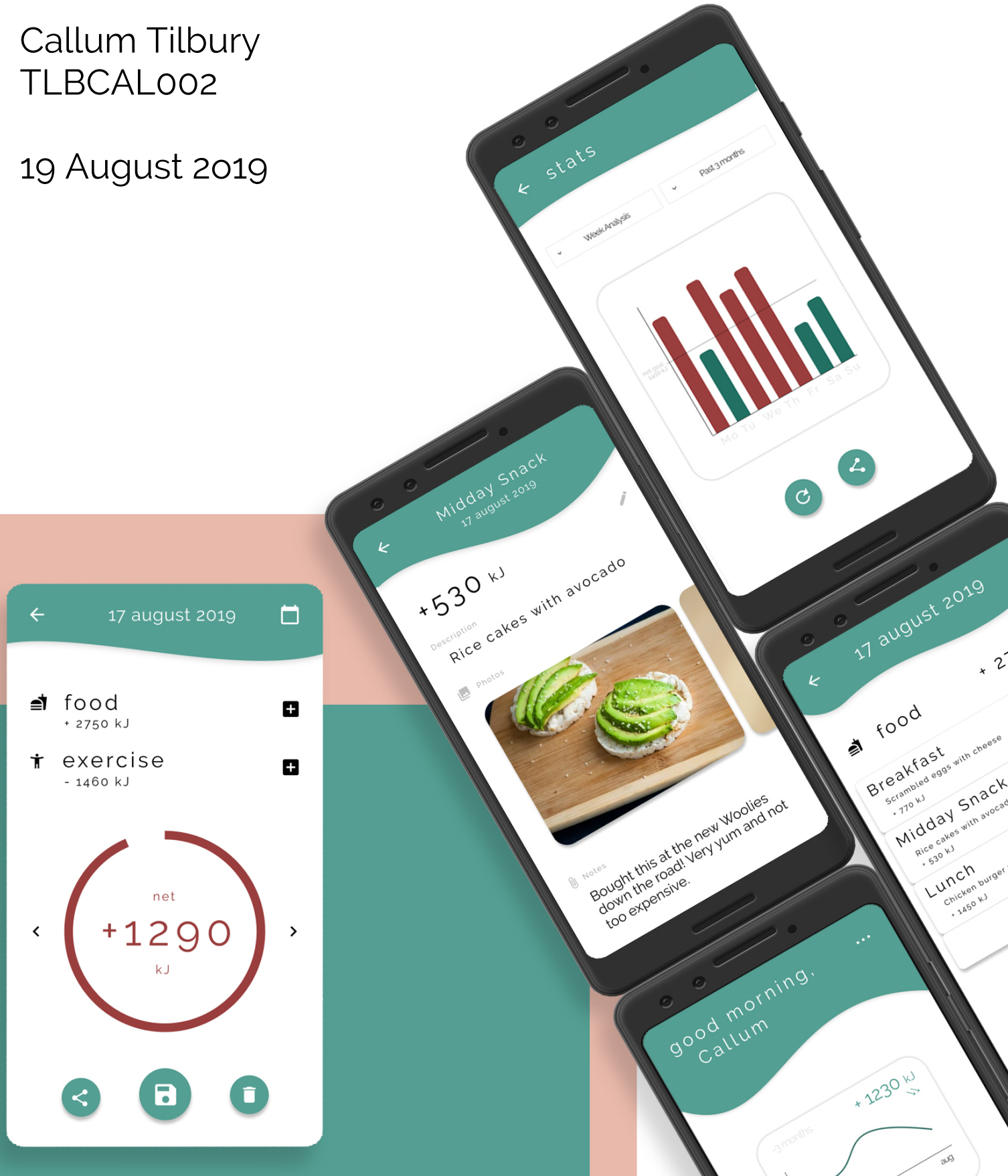
TLBCAL002

19 August 2019



Overview:

The KilojouleCounter is a simple, lightweight app that allows user to record an estimate of their daily net kilojoule intake (NKI) over time. A user documents their food consumption activities (kilojoules "in") and their exercise activities (kilojoules "out") during a given day, and the net daily amount is calculated. Each day can have many entries, and each entry can have photos, notes and descriptions. Recorded data is stored locally on the user's phone, and various reports are generated as the user continuously uses the app. The user can build a profile, which stores their information, and their kilojoule intake targets. These targets are consistently checked, and feedback is reported regularly. Tendencies and trends are provided to the user, along with tips for improvement if necessary. Daily food and exercise entries can easily be inserted using the existing library of generally accepted estimations of kilojoule values. The app also integrates with existing fitness apps – such as Strava and the Nike Running App – to allow automatic synchronization of exercise activities.

Target Market:

The target market for this app is people aged between 18 and 35 years old, who are trying to lose weight and get healthier. The design of the app is modern, minimalist and aesthetic, and thus it focuses on people who appreciate this style. It is assumed that the user has an Android smartphone, with API24 (or newer) installed.

Palettes:

The colour- and font- palettes below were selected for the application. Consistency is an important aspect to the app (Nielsen, 1994), and thus these styles have been used throughout.

For the colors, the polished pine colour (#549F93) is used for the majority of the app, together with clean white (#FFFFFF) backgrounds. The green creates a healthy environment effect, yet remains subtle and pastel. The amazon green (#37645D) is used occasionally for emphasis, and this contrasts nicely with the main pine green. The smoky topaz (#9B3E3E) is used for all responses usually regarded as negative – such as the daily kilojoule amount increasing. It is assumed that people using the app are from a culture where red indeed indicates "negative", and green indicates "positive" (The official blog of Bidroom, 2019). Finally, the desert sand (#E8B9AB) is used purely in this presentation as a complement to the greens.

For the fonts, a single family was chosen throughout the application, with subtle variations in weight indicating different purposes. Raleway is a sans-serif font which is both easily readable and enjoyable to look at. The light-weighted font was used for some miscellaneous text, whereas the regular-weighted variation was used for all body text. Headings used Raleway Medium.

Summary of New Features:

- **Feature 1: Improved and Advanced Calculator Experience**
  The calculator now allows for a far more detailed recording of a user's day-to-day activities. One can add photos and notes to entries, as well as select pre-defined entries from a large library of meals and workouts. A neat hierarchy has been added for information abstraction, moving from a high-level overview, to a detailed entry page, depending on the user's wants at a given time.

- **Feature 2: Synchronization to 3rd party apps**
  Many active people in the target market already have an array of fitness apps that assist them tracking their workouts. Notable examples include Strava and the Nike Running App. It would be futile to try motivate users to change from their existing apps, especially because these apps far more mature and well-supported than the KilojouleCounter. Instead, the 3rd party apps will be able to sync into this app, automatically adding exercise entries to a person's day.

- **Feature 3: Personalized experience**
  This feature is centered around personalization – making the user feel *connected* to the app. Various functionalities are added in this capacity, including a personal profile section, a full calendar of records, and most importantly, a statistics page – which provides detailed analysis into the trends of a user's kilojoule intake and expenditure.

These features all fit together nicely to enhance the user's experience, and ultimately, to ensure they continue to use the app going into the future. More details surrounding these motivations are given from the next page onwards.

General Considerations

Note: since the app has been designed with maximum consistency between activities, much of the discussion in this 'general' section applies to the whole app. While *some* important things will be repeated within each feature description, this will not be the case for everything mentioned below.

The new design starts off in **(A)** – a clean and minimalist home screen. A personalized greeting appears at the top of the screen, which includes both the relevant salutation for the time of day ("Good morning"), as well as the user's name ("Callum"). This immediately gives the user an impression of a relationship: it is not *just* a phone application, it can be the user's "friend". This notion is suggested throughout the application's interface, and it is a fundamental theme of the new design.

Upon opening this screen, one immediately notices the simple, aesthetic interface. A consistent colour scheme, a thin sans-serif font, coupled with generous space between widgets results in a pleasant look and feel. This is a primary goal of the design, and is directly in line with Nielsen's Usability Heuristics (1994). The neat interface attempts to leverage the "Aesthetic Usability Effect" (De Angeli et al., 2006) – which states that a user will perceive an app as easier to use when the app is more aesthetic. Since usability is a key objective, much focus has been given to the visual aspect.

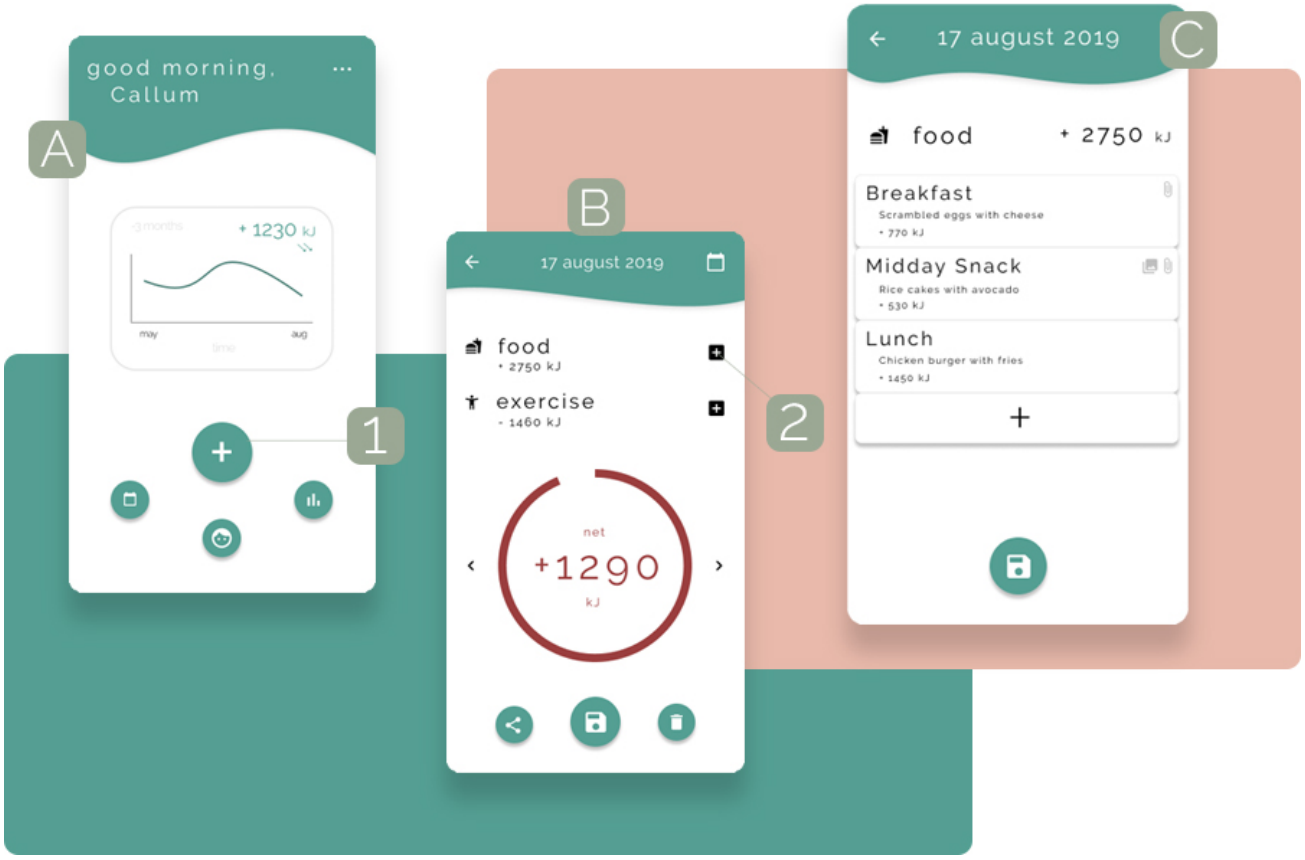
The interface is based primarily on "Material" Design principles (Google, 2019) – Google's guidelines for high quality digital design. Notice that each of the buttons and the central graphic are visually elevated from the background through subtle drop shadows. Upon clicking these elements, the user will receive visual feedback that they have been pressed and an action will occur. This also aligns with Nielsen (1994), where there application actions are analogous to "real" world actions. All icons originate from Material's open source library (Google, 2019), and this ensures consistency with other applications, thus minimizing confusion for a user. Furthermore, chosen icons perform the same actions as suggested by the Material guidelines (Google, 2019), which ensures the user's expectations match the implemented design. This agrees with the Principle of Least Astonishment (Isaksen & Bertacco, 2006): a user should be surprised by a particular functionality.

The only deviation from Google's design principles is the app bar: whereas Material often has a rectangular bar (Google, 2019), here the bar is 'wavy'. The aim here was to suggest a more fluid, smooth, comfortable user experience, conceptually "rejecting" a *rigid* way of thinking. Moreover, one will notice that the app bar's wave-like state changes between activities. This both distinguishes modes, as well as further reinforces the aforementioned ideas of fluidity and dynamism.

Feature 1: Improved and Advanced Calculator Experience

To navigate to the actual calculator for the current day, a user can click **(A.1)**. This button will likely be the most frequently used action, and according to Pareto Law (Craft & Leake, 2002), it should be the most easily available button. Considering Fitts' Law (MacKenzie, 1992), the button sits directly underneath the natural resting position of a user's thumb – as shown in figure to the right.

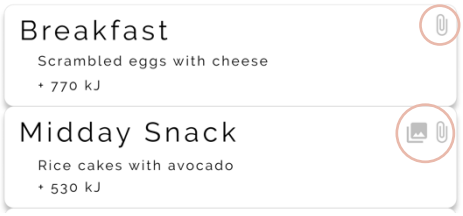
The interface will move from screen **(A)** to screen **(B)** when the button is pressed. The new screen will come in from the left (indicating a direction of movement) which helps if the user wants to go back to the home screen: the **back button** – which is in the standard Android position – points in the direction from which the user came.



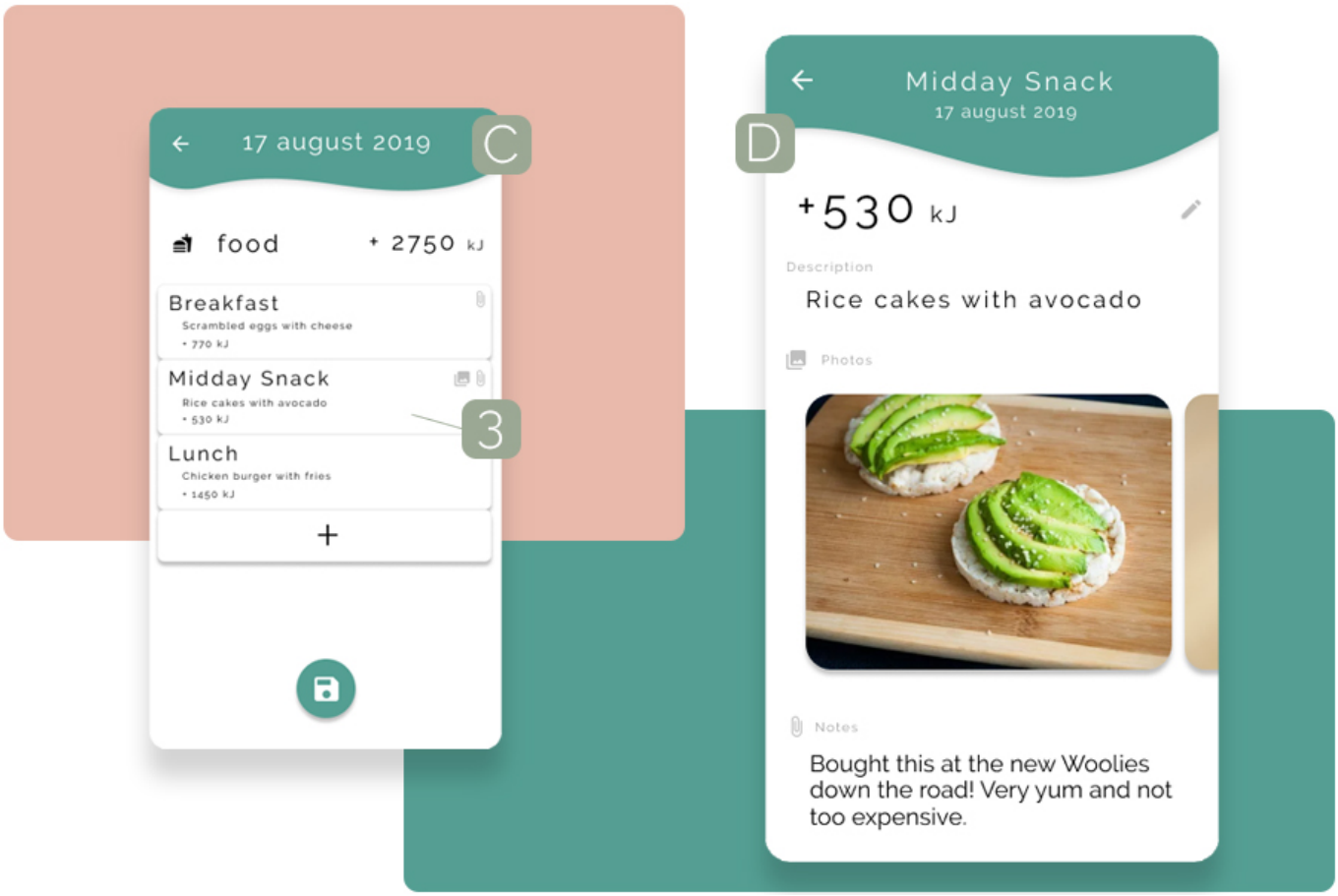
Once **(B)** has come into view, the loading of the day's kilojoule data will be animated, starting at zero. This will mainly be noticed in the central chart, where the colour and position of the circular bar will indicate how close a user is towards their target for the day, and will depend on how much of the day remains (more discussion of the "target" system is discussed in **Feature 3**). This visual representation of data is a common theme of the app, as it enhances a user's experience without increasing clutter. Moreover, little touches – such as the food and exercise icons – add visual cues to assist users in easy navigation. The next and previous day's entries can also be easily accessed using the forward and backward arrows. It ensures that Tufte's Law (Albers, 2004) is adhered to, by maximizing the signal-to-noise ratio. A user can enjoy interacting with the app through advanced and useful functionality, while maintaining the aesthetics of the interface.

Consider the app bar again. Notice that the text now reads the entry's date, while remaining subtle and outside of the screen's main focus. This is to satisfy Nielsen's "recognition over recall" heuristic (1994): a user can easily be reminded of what day they are currently busy with. The calendar icon on the app bar navigates quickly to today's date.

Next, a user can view some more details regarding either the food or exercise data for the day. By pressing **(B.2)**, for example, the screen moves to **(C)** – a detailed breakdown of the day's food information, including the title, description and kilojoule value of each meal. There are some subtle yet useful indicators on each entry, and these are shown below:



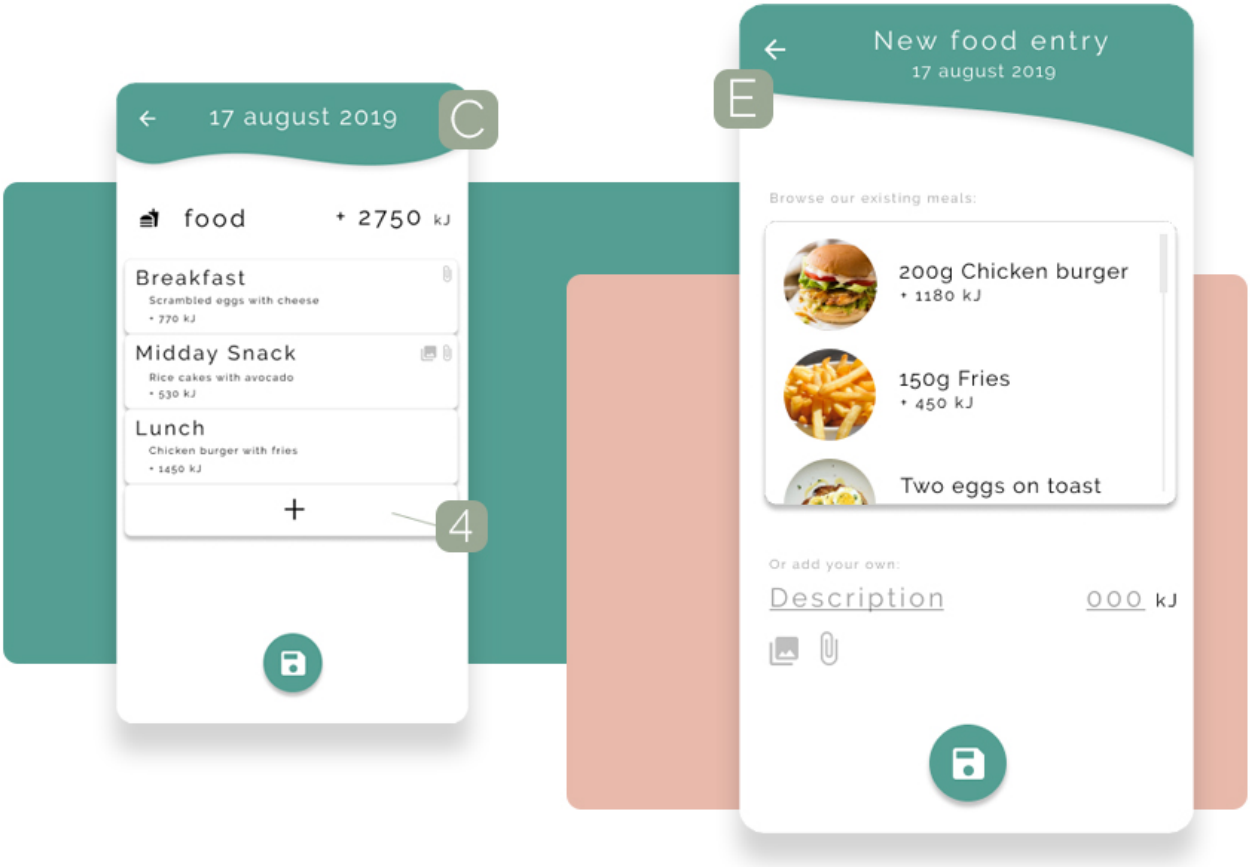
For each entry, a note and/or photo can be added – this will be shown later in the detailed food entry activity. However, prior to navigating to the detailed screen, a user can immediately tell whether or not a note/photo has been added to that day's entry: the circled icons shown in the alongside figure indicate this. A paperclip will be displayed when a note has been added; a photo will be displayed when a photo is attached. This further maximizes the signal-to-noise ratio (Albers, 2004), while enhancing the user's experience via a convenient reminder.



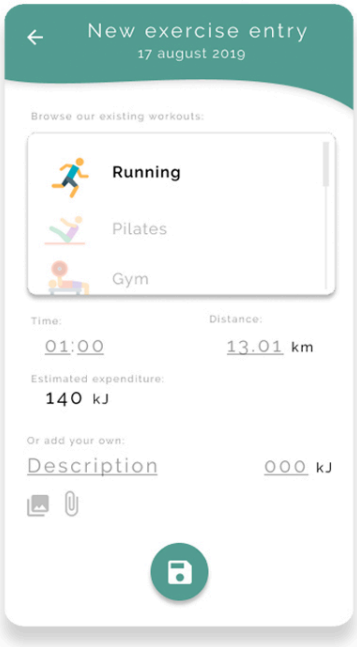
Consider the case when a user taps a day's entry – for example, tapping anywhere on the **(C.3)** entry will navigate to screen **(D)**. Here the user finds a detailed breakdown of a food entry on a given day. Again, the "breadcrumb" of this entry appears in the top bar (Nielsen, 1994), which is subtle but useful when needed. The key piece of information – the kilojoule value – is clearly visible on the page. Then, as the user's eyes move downwards, other information is given – the description, a gallery of photos and some notes. Notice that every entry is completely editable at any point in time. This approach ensures that a user has flexibility and freedom to use the app as they desire, aligned with Nielsen's user control heuristic (1994), even if they make a mistake. A user is thus affirmed of their internal locus control over when using the application – a golden rule advocated by Ben Shneiderman (1986).

The user can easily see when there is more than one photo attached, as the edge of the next photo is visible to the right of the central photo in view. This perceived affordance enables the user to not need textual instructions as to how they should navigate to the next photo – it follows naturally from the layout. This promotes aesthetic usability (De Angeli et al., 2006) – by keeping the interface minimalist – while ensuring ease of use. This function is also a common feature in other applications and adheres to the Principle of Least Astonishment (Isaksen & Bertacco, 2006) – many users will be used to this function already.

Consider the hierarchy of information the user is able to traverse here: from a high-level historic overview in **(A)**, to a day overview in **(B)**, to food/exercise overview in **(C)**, finally to the detailed entry view in **(D)**. This ensures that on each screen, only the necessary data is presented – adhering to Ben Shneiderman's Visualization Mantra (2003). Details exist but are abstracted to various extents. This also ties into the Pareto principle (Craft & Leake, 2002): a user will only want a detailed breakdown of each entry on occasion, whereas the high-level overview will be regularly used. By maintaining this hierarchy, the signal-to-noise ratio (Albers, 2004) on each screen is well managed, and the aesthetic usability (De Angeli et al., 2006) of the app increases.



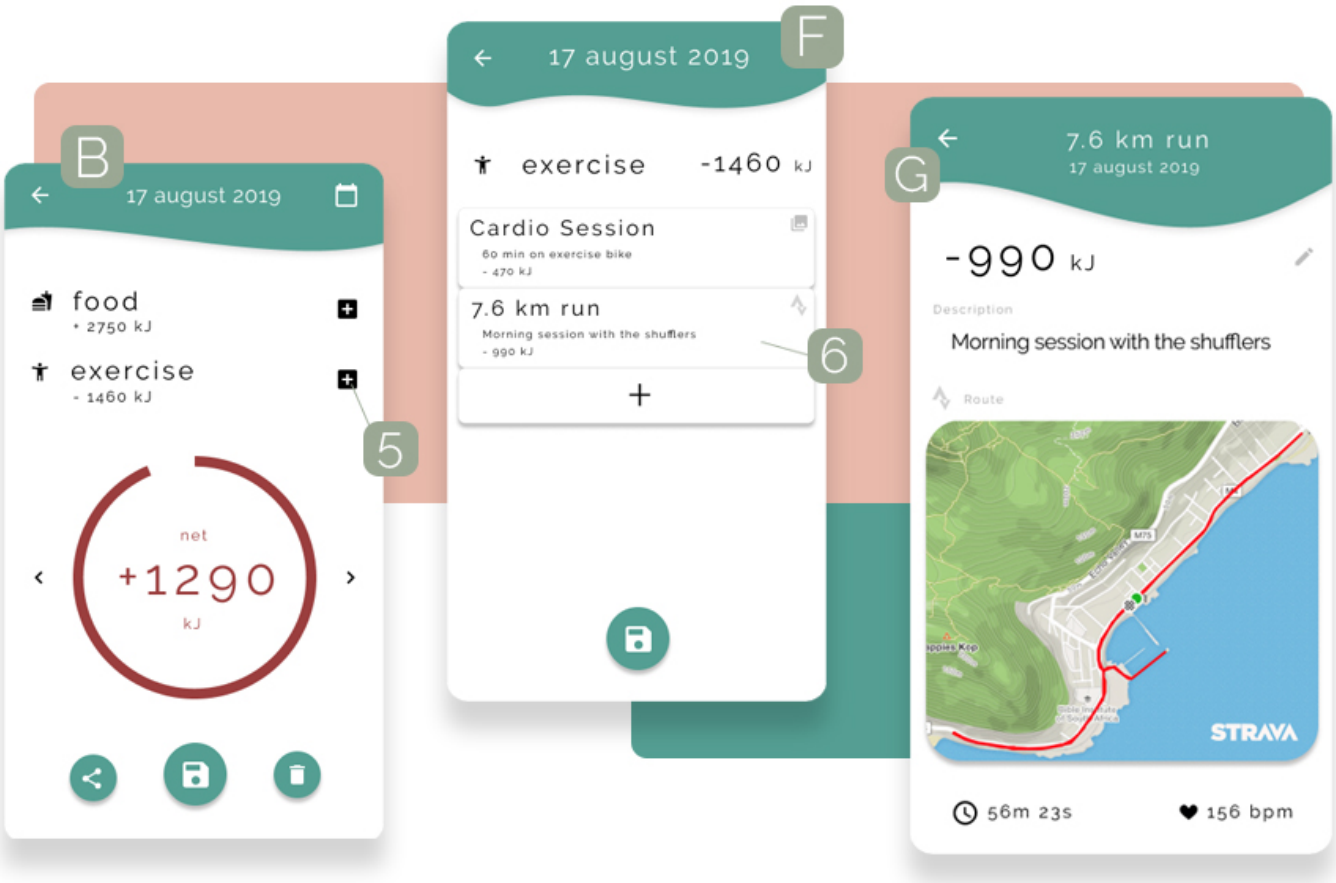
Finally, consider when a user clicks **(C.4)** – to add an entry. Screen **(E)** comes into view with another clean interface. Here a user can browse through the library of existing meals with known estimates of kilojoule values. This function is dual purpose: firstly, meals that the user eats regularly can easily be accessed – the Pareto Principle (Craft & Leake, 2002), and secondly, it assists the user in estimating the kilojoule values for a particular meal. The latter reason ensures universal usability – one of Ben Shneiderman's golden rules (1986) – to those users who are unaware of what kilojoule values various food items contain, or would prefer not to do the estimates themselves. Nevertheless, a user's freedom – stressed by Nielsen's user control heuristic (1994) – is not lost, and they can still completely customize a days' entry.

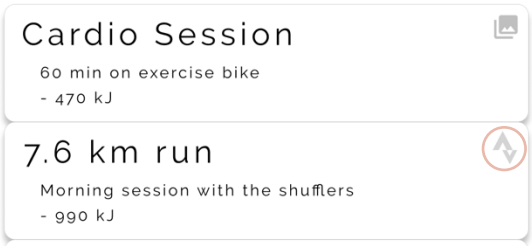


Similar customization features to those mentioned above exist for the 'exercise' category as well. An example of this is shown in the figure alongside. A user can enter various metrics for a particular workout, and the app will automatically estimate the kilojoule expenditure using generally accepted estimates.

Feature 2: Synchronization to 3rd party apps

To see this functionality in action, consider the effect of pressing button **(B.5)**: the app navigates to screen **(F)** – an overview page of that day's exercise. To adhere to Nielsen's Consistency Heuristic (1994), notice that screen **(F)** is identical in structure to screen **(C)**. This allows a user to become comfortable and familiar with the design standards employed, and thus the Principle of Least Astonishment (Isaksen & Bertacco, 2006) is also satisfied. As a result of the consistency, much of the design considerations mentioned for screen **(C)** apply here too – especially the maximization of the signal-to-noise ratio through an aesthetic and clean interface.





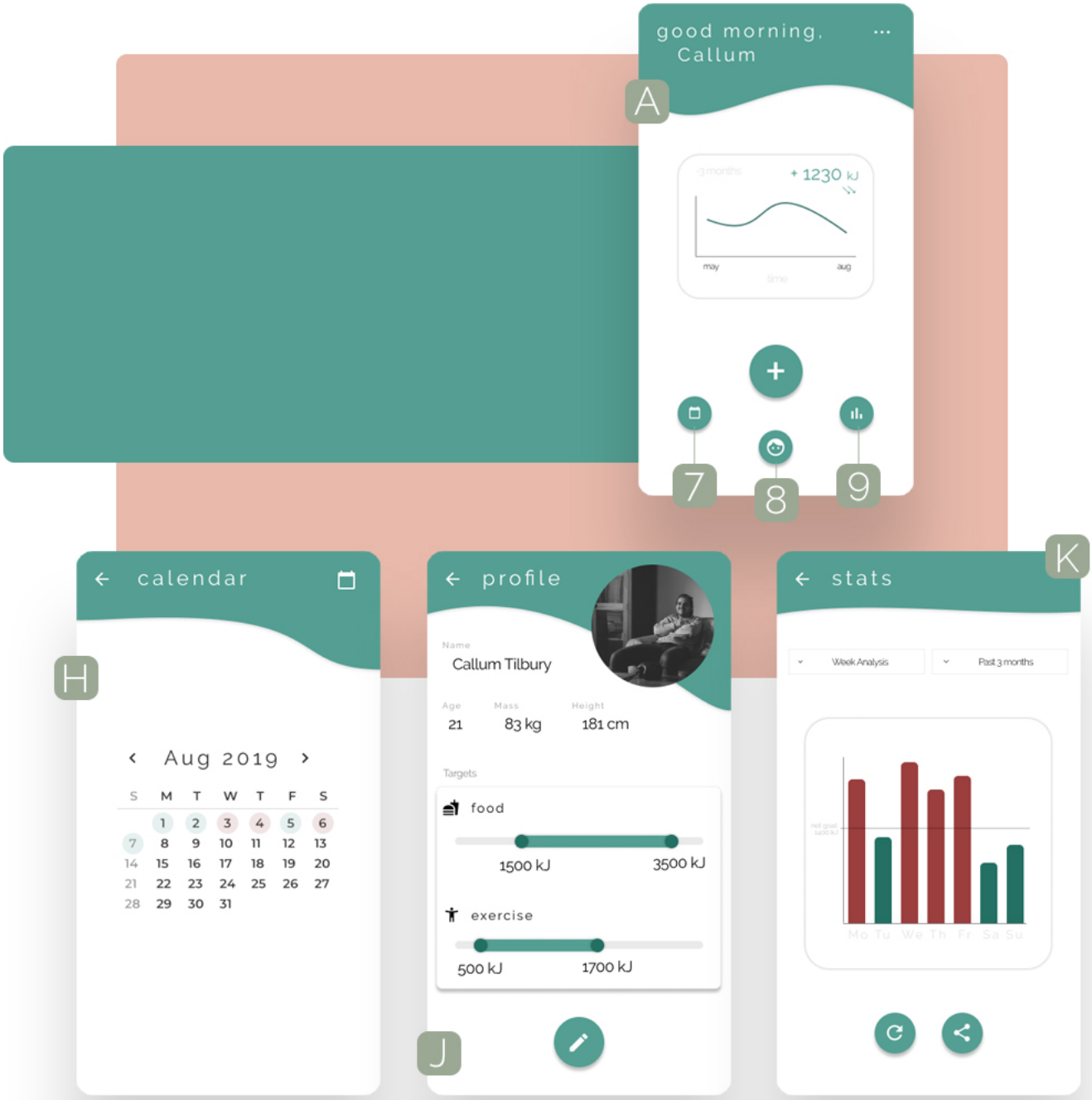
Now, however, there is an additional indicator on a day's entry:

This little icon tells the user that this entry was imported from another app – in this case, Strava. By clicking the entry **(F.6)**, the user is shown the entry in more detail on screen **(G)**. The style of this entry may depend on the 3rd party app from which the data comes, but this example gives a general idea of the minimalist style – providing only the necessary details. Conveniently, a user is able to tap the imported route info, and the original app/website will open on that activity. This summary page within the app reiterates Ben Shneiderman's Visualization Mantra (2003) – only the high-level overview is given here, but if the user wants to dive into deeper analytics for the entry, they have the freedom (Nielsen, 1994) to do so conveniently.

Note that 3rd party apps often store kilojoule data with the units of "calories." To convert this, a simple conversion can be used on the data: 1 Calorie equals 4.186 kilojoules.

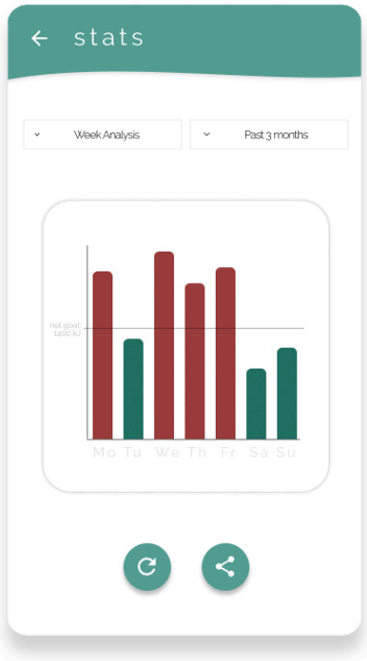
Feature 3: Personalized experience

Lastly, consider the figure depicting the personalization experience within the app, below. Screen **(A)** is the home screen, and there are three buttons to navigate to the three personalization sub-features.

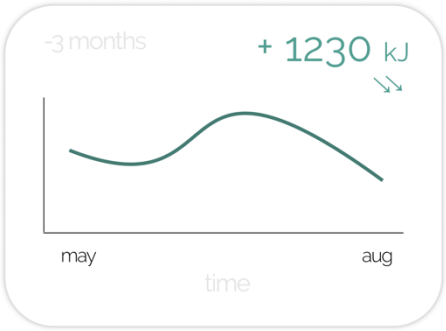


The first of these sub-features is screen **(H)**, which is found by pressing button **(A.7)**. This clean interface simply consists of a calendar depicting the history of the user's records. By using circles of two different shades – green and red – on past days in the calendar, the user receives a high-level overview of whether they met- or exceeded their target for that day. This is a simple way to present the user with lots of information in a concise way, promoting aesthetic usability (De Angeli et al., 2006). In line with Ben Shneiderman's Visualization Mantra (2003), the user is then able to click on a day in the calendar, and will be taken a screen like **(B)**. The colour of the chart there will match the colour in the calendar – promoting consistency, as encouraged by Nielsen's Consistency Heuristic (1994).

The next sub-feature is found by pressing **(A.8)**, which navigates to screen **(J)** – a profile page. This allows the user to enter some data about themselves – weight, height and age. By knowing this info, the app will be able to suggest appropriate tips and targets for the 'type' of person that the user is. This level of personalization is common in successful apps these days, and will likely motivate the user to continue to use the app. Moreover, an important feature of the app is the "target" functionality: a user can set a desired range for daily targets, for both consumption through food and expenditure through exercise. An easy graphical depiction of these limits is given, and this satisfies Tufte's concept of the signal-to-noise ratio (Albers, 2004) – ensuring that all important information is clearly seen. A user can edit these profile fields at any point in time, thus reinforcing the idea of an internal locus of control – an important consideration suggested by Nielsen's Heuristics (1994).



The third and most important component of personalization, is the sub-feature found by pressing **(A.9)**, thus navigating to screen **(K)**. This is the "stats" page, and it contains a host of detailed statistics surrounding the user's records. For example, a user can perform a "Week Analysis" using data from the past 3 months of usage. What results is a graph seen in the figure alongside: a daily average grouped by the days in the week. A user can use this, for example, to identify days which are particularly bad, understand why this is happening, and implement strategies to improve. A user can save or share these graphs to other apps, with a simple click of a button. Many other combinations of analysis and time-frames exist, and a user has many customization options – a key point emphasized by Nielsen's Flexibility Heuristic (1994). Notice that the graph given is clearly colour coded according to the app's themes, which further emphasizes consistency across the app – satisfying Nielsen's Consistency Heuristic (1994). Simultaneously, the signal-to-noise ratio is improved (Albers, 2004), by displaying lots of information in a clear and aesthetic way. The whole screen remains clean, and usability remains easy.



Finally, consider screen **(A)** again. The graph displayed here is a high-level overview of the 'stats' page, displaying a user-defined combination of analysis and time-frame. For example, suppose the user wants their home screen to display the average daily Net Kilojoule Intake for the past 3 months. Their screen will then include a graph as shown alongside:
This graph will display the trend as smoothed line, using a least-squares polynomial approximation – this improves the aesthetics of the interface, while still providing the user with a general idea of their trend. Furthermore, the colour of the text and line will indicate the nature of the slope of the graph: if the graph is trending downwards, this colour will be green. If, however, the graph is trending upwards – i.e. the user's kilojoule intake is increasing – then this colour will be red, as shown below.

This convenient colouring is both consistent with the rest of the app (Nielsen, 1994), as well as convenient for the user to view a high-level summary of the data. If the user, say, wants to view the statistics in more detail, they can simply click the graph and it will take them to screen **(K)**, with the appropriate parameters set-up automatically. This satisfies Ben Shneiderman's Visualization Mantra (2003).

[3485 words]

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