

# An Exploratory Diary Study On Modelling Morning Routines

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## ABSTRACT

Behavioural support agents help to monitor peoples' behaviour and aim to assist people in changing their behaviour. Over the past years, the influence of social media and phone applications that aim to do a similar thing have risen. There are datasets that give an insight into the morning routines of people, but those do not contain qualitative data like what people consider a habit, or whether they like to report on their morning routine. It is also unknown how people would intuitively report on their morning routines when asked to do so. This research will use a diary study combined with semi-structured interviews to better understand the way people report on their morning routines and find out ways in which this data can complement future research on behaviour modelling and an eventual behavioural support agent. This exploratory research will give indicate whether it is useful to complement quantitative data on morning routines with qualitative data and make suggestions for design requirements for a behavioural support agent in the form of a phone application.

## Keywords

Morning routines, Behaviour modelling, Habits, Support agent, Behaviour,

## 1. INTRODUCTION

Lifestyle improvements are a hot topic, and more and more people are conscious about their lifestyle and day-to-day habits. With over half the worlds' population in possession of a smartphone [8] it is not a surprise that the biggest social media companies influence the way people view their lives. For example, Instagram has an audience that thrives on people comparing themselves to each other and to celebrities. It is no wonder that people are drawn to these celebrities and want to live a similar life. Living a healthy life becomes the standard and communities arise that are interested in living this way.

Often, influencers are paid for product placement, like for the use of smart wearables. Smart wearables like a Fitbit, help users to monitor things like their heartbeat and there are even smart fridges that can help their owner to eat healthier [7]. It is commonly understood that the rapidly changing world causes many people to live unhealthier and exercise less [11]. A smart fridge could assist in changing the behaviour of

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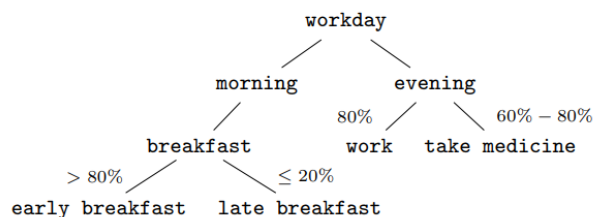
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people to make them live healthier lifestyles. Technology that helps people in their day-to-day life is called behavioural support technology [2] and is used in many applications nowadays.

Besides physical devices, people use phone applications that can assist with related topics, like calorie intake, steps walked, or what groceries to buy. There are numerous productivity applications that are, in essence, elaborate to-do lists. How people like to interact with such applications differs per person and we do not know how people would intuitively report on their behaviour. With this exploratory research, we aim to better understand morning routines of people, using qualitative methods, but more on that in the "methods" section. First, it is important to understand how morning routines are related to a healthy lifestyle. We have heard of getting out of bed on the wrong side, a saying that illustrates the importance of a good start of the day. People's morning routines play an important role in the way they start their day. If we better understand how those routines influence the mood of people, we can also coach people in adopting better routines. To be able to coach people, we must first understand the way in which people report on their routines.

Currently, there are probabilistic feature diagrams (See Figure 1.) for behaviour support agents [12], diagrams that are meant to express people's behaviour. These diagrams are used to display activities and sub-activities based on probabilistic values. An example would be breakfast as main activity and below "early breakfast" and "late breakfast" with their associated probability of occurring. These diagrams are represented in tree-form, such that each part of a day may or may not include a certain activity, supported by their probabilistic value.

Figure 1. Example of a probabilistic feature diagram. [12]



When someone is asked to report on their morning behaviour, this is probably not be the way in which people would intuitively report on their behaviour and thus led to the following research question.

**RQ 1:** In what way do people intuitively report on their morning routines when they are not given a detailed instruction on how to do so?

This research question needs some sub-questions to be more concrete though. The way people report could relate to the medium that people use, or the structure that they use when reporting. Therefore, **RQ 1** is split in the following questions.

**RQ 1.1:** What medium do people intuitively use when asked to report on their morning routine, without a detailed instruction on how to do so?

**RQ 1.2:** What structure, e.g., hierarchical/sequential, do people intuitively use when asked to report on their morning routine, without a detailed instruction on how to do so?

Although these questions are quite similar, it is important to make this distinction. Both questions have implications for the eventual design of a behavioural support agent, but for different parts of the agent. A hierarchical input for activities looks nothing like a sequential input, or even an unstructured input.

Support agents can have difficulties with finding the correct patterns in large datasets [19], so some interaction with humans is needed. New technology is needed that can make sense of all the collected data and for this, more research is needed [16]. We are looking for a way to enrich the performance of an agent with the help of qualitative data. The qualitative data could provide meaningful insights that could be used to improve the performance, particularly the habit determination accuracy of an agent. This led to our second research question.

**RQ 2:** What kind of complementary insights could a qualitative study on morning routines give with respect to the data gathered through **RQ 1.1** and **RQ 1.2**?

## 2. RELATED WORK

Behaviour and habits are closely linked to each other, and some might say they can be used interchangeably. For this research, however, it is important to note that a habit is repeated behaviour that depends on the context of the situation [14]. Habits often go unnoticed by the people that perform them as they happen unconsciously and are meant to save the brain from work when doing routine tasks [4]. Behaviour is also mostly performed unconsciously and is more based on single events and could also be unrelated to habitual behaviour [5]. For behaviour to become a habit it takes many iterations of that behaviour, and it hurts the formation of a habit when someone misses even one iteration of that habit, as explained by Lally et al [13]

The goal of a support agent is to change the (bad) habits of a person to help them improve their lives in a way they want it. Research has been done on eliminating bad habits and understanding their nature [3, 6, 15]. Bad habits arise when bad behaviour is rewarded time and time again. This is also the case for good or normal habits, but those are not negatively impacting the people that execute that behaviour. To get rid of a bad habit you can eliminate it or replace it with a coping mechanism.

When looking at the types of habits, not much research has been done on morning habits specifically. There has been some research on eating and smoking habits [9, 10, 17] These give an insight in the food people intake, which is a part of a morning routine most likely. However, when people skip breakfast there would be no food related habit involved in their morning routine.

People that are older, are more likely to have routines, or to have a midlife crisis [18]. This means that they stick to their routines stricter compared to younger people. To obtain new habits, it can take between 18 and 254 days, according to Lally et al. [13]

## 3. METHODS

There are several steps for answering the research questions. First, a diary study has been conducted to be able to answer **RQ 1.1** and **RQ 1.2**. 8 Participants (aged 20 to 52) were asked to report on their morning behaviour for a week. They were not given a detailed instruction on the way that they should report, our goal is to find out what they would do intuitively, with little to no guidance. Also, they could report any behaviour that they like, without disclosing anything that they do not feel comfortable sharing of course. Since the research is only conducted over one week, we did ask our participants to make a report for each day of that week. Since people have different schedules, we defined “morning” in the following way: The time you take from waking up/getting out of bed to the point where you start the first “task” of the day. This task could be work, school, studies, or something else. What they considered their first task was also up for them to decide. On days where there are no such tasks, participants could decide for themselves when the morning ends. We gave them the suggestion to stop when the afternoon begins. We consider this research a diary study, since diary studies are meant to give an insight in the life, or in this case habits, of an individual that a survey or interview cannot provide [4].

The content of the reports was analysed to get detailed insight that helped answering all research questions. In this process, all reports are anonymised and put in a single document. The different methods are distilled using keywords that imply something about the method. Next to that, we looked at recurring clusters of data and their frequency for each participant, as well as the length of the reported morning (sometimes including the length of specific activities) and the granularity of the reports. A cluster of data contains multiple activities that are usually performed in the same way. This could mean that they are always in the same order, but it could also mean that these activities were performed in parallel. These four different types of results are supported with examples from the data. The results and examples will help us in answering both main research questions.

To elaborate on the second research question, we interviewed the participants and asked them how they reflect on the experience. Some questions relate to the method that participants used, while others were focussed on the contents of their reports, as well as questions related to an eventual phone application for this process. Semi-structured interviews were used for this so that the answers are easier to categorize. A fully structured interview did not provide the flexibility needed for this research, due to the differences in reporting methods and reported data. Some interviews were recorded to be able to transcribe the data after the interview was conducted. The complete list of 9 standard questions that were asked to all participants are listed in appendix A.

## 4. RESULTS

In section 3 we state the methods with which we are going to carry out this research. There are three main methods used, a diary study, semi-structured interviews, and analysis. These results can be put in two main categories: Reports and responses.

### 4.1 Diary Report Results

The results of the diary reports are quite diverse and fall in four different categories, described below.

### 4.1.1 Keywords

Keywords are determined based on the method a participant uses to report on their behaviour and pertain to the chosen method of a participant. Distinguishable keywords often come in duos with either one being applicable to the method of a participant. For example, 6 out of 8 participants used an online reporting method, while the other two used a physical method. Online methods include note taking applications, videos, Excel, and Word, while offline methods included pen and paper. We found the following keywords and their associated frequencies (out of 8).

- Physical 2, Online 6
- Structured 6, Unstructured 2
- Portable 6, Not Portable 2

Structured/Unstructured indicates whether participants used a certain structure and kept to that structure, for example if a participant uses tables to report their behaviour and whether they stick to this method over the course of the week. Portable and Not Portable indicate whether the reporting method can be done at more than one place. For example, when using a home computer, we consider that method not portable, but when it is done on a phone we do consider it portable. When taking the “average” set of keywords, this indicates that the preferred method among these participants is as follows.

Online, Structured, Portable

This finding has implications for **RQ 1**. It indicates that people intuitively report their mornings in a structured, portable, and online manner, while also indicating the day of the week and its corresponding date.

### 4.1.2 Clusters of Activities

Clusters of activities are grouped activities that usually occur in the same order (e.g., sequential), or timespan. Some clusters do not follow the same sequential order and examples of those kinds of clusters are given later. A list with all discovered clusters can be found in Appendix B. First, some examples of sequential clusters.

1. Getting out of bed > Use the toilet > Skincare routine > Get dressed.
2. Toilet > Shower > Clean shower > Open windows > Get dressed > Moisturise > Apply deodorant > Make bed.
3. Alarm > Snooze > Unplug earplugs > Listen to music on radio.

Example 1 occurred on most days that this participant recorded their behaviour and always occurred in the same order. Examples 2 and 3 sometimes contain more activities like “Washing hair”, and “Cat on bed”, respectively. To illustrate that a cluster of data does not necessarily have to be sequential we show another example.

- Drink coffee > Eat breakfast > Read newspaper.

This cluster also appeared on most recorded days of the participant, but not in the same order, the reason being that the participant performed these activities simultaneously. Sometimes, the activity “Listen to radio/music” was also included within this cluster.

Another participant made use of a hierarchical structure when reporting on their behaviour. A main activity was described, and sub-activities were added to that main activity. Two examples of this below.

1. Main activity: “Getting out of bed, Getting ready”, with sub-activities: “Shower, dress up, brush teeth, etc.”
2. Main activity: “Waking up”, with sub-activity: “Check social media in bed.”

Interestingly, it was not possible to discover clusters for all participants. Some reported in such an unstructured manner that the only “cluster” could be that they get out of bed and start with their first task at some point. We will not consider this a cluster within the scope of this research.

In general, most participants’ reports contain at least one cluster of activities that repeats on multiple days. The largest cluster we could find contains all activities that this participant reported on a single day. This participant displayed this exact behaviour on the first three days of reporting, including the same topping on their bread. Even more interesting is the fact that this long, sequential cluster also contains sub-clusters. We discover that a cluster of a certain type (e.g. sequential) can contain a sub-cluster of a different type (e.g. hierarchical). We display below how this big cluster was reported in a different way than before, due to its scale.

- First alarm > Second alarm > waking up > 5 min on phone > Getting out of bed > Going to toilet > Getting dressed > Making breakfast >
  - 1 glass of water > 1 slice of bread with chocolate sprinkles
- Make lunch for work >
  - 2 slices of bread with peanut butter >
- Finished breakfast > Brushing my teeth > Doing my hair > Getting backpack > Put on shoes/jacket > Leave for work.

We find that there are three different types of clusters: *Sequential*, *Simultaneous* and *Hierarchical*. These findings have interesting implications for **RQ 1.2**, as there doesn’t seem to be one main way of reporting, nor do people seem to use one way exclusively.

### 4.1.3 Morning Length and Activity Duration

Among the 8 participants, 5 reported the length of their reported morning behaviour. The remaining 3 participants did not indicate a clear length of their morning routine. There is a large difference between the length of the reported mornings between participants, but in some cases also between different days among one participant. For example, the average reported length of the morning of one participant is roughly 3 hours on most days, but on one day it only took half that amount of time. The average amount of the 5 participants that reported the length of their mornings is 1 hour and 24 minutes.

Besides the length of the total morning, we find that some participants use timestamps to indicate the length of certain activities too. We see that the second example of a cluster (from 4.1.2) takes somewhere between 20 and 30 minutes, for instance. For this same participant we see that breakfast usually takes somewhere from 10 to 20 minutes on average. We can consider the length of these activities as part of their habit, as this is a recurring time. Below we list activities with a clear duration range. Some activities, like breakfast, will be listed with multiple timespans, as their duration is known for multiple participants.

- Breakfast: 10 – 20 min; 8 – 15 min; 5 – 15 min;
- Personal Hygiene: 20 – 30 min; 30 – 45 min; 10 – 60 min; 5 min;

Snoozing: 25 – 35 min; 15 min;

Walk the dog: 60 – 105 min;

These duration ranges indicate that the corresponding activities are usually performed within these ranges and that some participants have larger ranges compared to others. Why participants take longer can depend on different factors. They might add something to their usual activities, for example when the second cluster of activities (from 4.1.2) contains “Washing hair”, the total duration of personal hygiene will increase. An activity can also take longer when a person is in a slow mood or is not in a rush.

While the length of the mornings and activities do not provide any insights with regards to **RQ 1**, it could be helpful for the eventual agent to include the length of the reported morning activities, to be able to notice when a person takes much longer to perform an activity than usual. More on that in section 4.2.1.

#### 4.1.4 Granularity

The level of granularity indicates the amount of detail that is being put in the reports. As expected, the granularity differs greatly per participant, with some reporting the toppings of their sandwiches and others only just mentioning that they had breakfast in general. Just like the clusters of data described in section 4.1.2, there are different types of reports that we consider granular, based on different factors, like whether they used timestamps, or the level of detail in describing activities. To better illustrate the difference in granularity among participants, we give examples from the most and least granular reports.

First, the most granular report. We see that this participant uses timestamps for all performed (sometimes series of) activities, as well as reporting often. The activity “Go downstairs” is reported each day, sometimes with its own timestamp, or combined with other activities. The exact contents of their breakfast are reported, as well as activities like “Deodorant” and “Make hair wet”.

Second, the least granular report. This report is on the other side of the granularity spectrum when compared to the first example. On one day, this participant reported: “Woke up an hour ago and doing laundry.” This was the only “activity” reported on this day. Interestingly, this participant also shows days with a much higher level of granularity. For example, the activities “Chatting with roommate”, “Remembering to do laundry” and “Eating breakfast (sandwiches with chocolate spread)” are much more detailed.

Next to that, there are of course six other participants that reported on their morning behaviour with different levels of granularity. We find that, besides the most granular report, people are mostly not reporting on activities like walking from one room to another. The more general activities, like waking up, personal hygiene and breakfast are described. Interestingly, most people do describe the contents of their breakfast if they had any. It makes sense for people to report more detail for activities they consider important. Some more examples of activities, ranging from really detailed to not detailed at all, are listed below.

Read newspaper during breakfast and listen to the Beatles.

Read book during breakfast.

Making breakfast, 1 glass of yoghurt drink, 1 slice of bread with chocolate sprinkles.

Looking at phone and respond to messages.

Breakfast (baked eggs).

Wash up.

Work.

These examples further illustrate that there is no clear level of granularity that people go into when reporting on their morning behaviour.

## 4.2 Interview Analysis

In this section, results from the 9 standard interview questions from Appendix A will be reported, as well as some additional results that came from individual questions.

### 4.2.1 The Enjoyment That Comes From Reporting

Answers to questions 1, 6, 8, 9 and more will be discussed here. These questions are all related to the experiences of the participants during the week of reporting.

Some participants enjoyed the reporting process and they felt like it helped them to be more productive and waste less time in the morning, but for others it was more a nuisance. They would forget to do it and it felt like another task they had to perform during the day. Although one participant had to remind him/herself to report, it did not influence the quality of the reports according to the participant. Another participant mentioned the exact opposite: *“I usually forgot to report until the afternoon, the details become a little fuzzy at that point.”*

For most participants it was also an average week, so this makes the reports more representative of their regular behaviour. One participant explained that this week was not representative of a normal week at all, due to their work schedule.

*“When my schedule would be more like a normal week, the morning routine would look completely different.”*

As for the frequency with which participants were tasked to report, one report a day, they were unanimously content.

*“It makes sense that we had to report each day. Maybe when you report for a while it becomes less necessary to report every day.”*

*“If you incorporate it in your routine, it is a nice amount.”*

Although, most participants did not mind the reporting process, some remark that they were glad that the week was over. These findings can help us with the answer for **RQ 2**.

### 4.2.2 Thoughts on Intuitive Methods

Answers to questions 2, 3, 4, 5 and more will be discussed here. These questions relate to the method that participants used to report on their morning behaviour.

The method that participants used was usually the most obvious choice they had available. For some this meant taking notes on their phone, for others this was pen and paper. It really depends on the type of activities that people do throughout the day to come to a logical method. One participant decided to make vlogs of their mornings and had the following thought process:

*“It was an easy method. Accessible and low effort, also fun for the researcher to watch. When writing you have to think a lot about what you write and speaking just comes more natural.”*

The other participants also describe their methods as the obvious choice. Reasons like accessibility for portable options and ease-of-use for more rigid methods were common.

*“Google docs is available wherever I go.”*

*“My phone is always on my side, so it was easy to use that.”*

*“I also keep track of my work hours in this way, so it made sense to use a similar method for this.”*

Most participants would use the same, or a slightly adjusted version of their method when they would do it again. Most complaints are minor and mostly relate to the ease-of-use or remembering to report.

*“It was difficult to determine the timeline and it was annoying to write down timestamps in the notes application.”*

*“It would’ve been easier if I just had to fill out a standard form each day.”*

When asked what they liked about their method, all participants mentioned that they had picked an obvious, easy method. One participant felt like their method was so obvious, they didn’t even consider something else.

*“This is basically the only way to do it right? Just writing down what you do is a natural, logical method.”*

To summarize, most participants were happy with their method, besides some occasional minor inconveniences.

#### 4.2.3 Desired Additional Functionality for Methods

This section will consider question 7 and will be showing design requirements for a mobile version of the method that participants used. It makes sense for this section to repeat question 7 here.

*What additional functionality could/should a phone app version of your method provide?*

It is important to note that this question concerns their chosen method, translated to an online environment. For one participant that used pen and paper it was obvious how they felt about that.

*“I’m not interested in such an application at all. I get really frustrated with phone applications. It takes too much time to do anything and you have to wait for things to load, etc.”*

What this participant did not realise is that they just gave two design requirements for the application.

- The application should not be cumbersome.
- The application should be fast.

Other design requirements listed by the participants are the following. The application should:

- Have programmable times.
- Make suggestions for routines.
- Autofill habits when you type.
- Recognize your routines and actively work with that.
- Eventually only be used to report on exceptions.
- Not use a login screen or should automatically login.
- Ask for a goal, for example to help you eat breakfast more consistently.
- Help with reaching your goal.
- Look pretty.

- Have an excel-like functionality option.
- Be google home connected, so you could talk to it.
- Not force suggestions on you.
- Have daily reminders and follow up reminders.
- Automatically add the time to an activity.
- Use minimal button presses to reach its main functionality: reporting behaviour.
- Have a to-do-list for activities you want to include in your morning.

These design requirements are quite general, and most requirements fit nicely with each other. We got some great insights with regards to **RQ 2**.

## 5. CONCLUSION

The results from the previous section provide insights for answering the (sub-)research questions. The answers to these research questions, as well as the thoughts behind the answers will be discussed in this section.

### 5.1 Answering RQ 1

**RQ 1** consists of two sub-questions. **RQ 1.1** does not have a clear-cut answer to it, but we do see a trend in the results. Participants preferred to use an online, portable reporting method, such as a phone application. However, the exact medium was different for almost all participants. Online, portable methods include pre-installed note taking applications for phones, videos and Google documents. Depending on the person, an Excel sheet or Word document could also be considered an online, portable method. However, participants that used these methods were not taking advantage of this potential portability.

The answer to **RQ 1.2** is more straightforward. Most participants used a sequential way of reporting, with sometimes the addition of other types, like simultaneous and hierarchical methods. The sequential method being the dominant method amongst these three. Although the sample size is too low to be scientifically significant, the results suggest that the sequential method is the most intuitive method.

### 5.2 Answering RQ 2

There are many things to uncover when trying to answer a broad question like **RQ 2**, but we discover through our interviews that there are three main complementary insights that this qualitative research yields. These insights are deducted from the interviews and their results, provided in section 4.2.

First, our participants were mostly fine with reporting their morning behaviour and did not mind the task, although some were glad when the week of reporting came to an end. One main takeaway is that some participants were more aware of their behaviour when they reported on it, which lead to less wasted time in the morning in some cases.

Second, participants were fine with the method they intuitively picked. Some minor tweaks to methods, that usually benefit the convenience of the method, would be appreciated, and were sometimes also implemented. Another thing that stood out was that a couple of participants would like to have more guidance if they were to report on their mornings again.

Third and final, participants have creative thoughts on design requirements for a phone application for this particular purpose. The main thoughts are related to the desired speed

and usability of the application. Multiple participants mentioned that they would like a fast application. The total list of mentioned design requirements can be found in section 4.2.3 and should provide plenty insights for a final support agent. One takeaway that is not listed specifically is that participants prefer a phone application over another type of application.

## 6. FUTURE WORK

Our research has shown a couple of new insights, but due to the small scope, there are more interesting things to discover. The first thing that comes to mind is to let participants report their morning behaviour for a longer amount of time, maybe a month. Also, it could be interesting to let participants report throughout the day, instead of only their mornings. These ideas are related to a wider scope.

We could also tighten the scope of the research and focus on specific elements of the morning routine. Whether people snooze in the morning, and if they snooze, for how long they do so. The frequency and duration of each alarm could be interesting to discover.

When looking more specifically towards an eventual behavioural support agent in app form, we could investigate more specific design requirements when prototypes start to roll out. Looking into adding multiple features to the agent, like a breakfast tracker, or sleep tracker can be an interesting option as well. People look for apps that provide multiple features. Most social media applications have a main function, showing photos and videos in the case of Instagram, but also provide sub-features, like a chat function and stories. It could be interesting to investigate the use of smart wearables in combination with morning routines. A smart watch, or Fitbit is able to measure the amount of sleep per night, and we might find connections in someone's morning related to a good/bad night of sleep.

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## APPENDIX

### A. SEMI-STRUCTURED INTERVIEW QUESTIONS

This appendix will show all nine standard questions asked during the semi-structured interviews. In addition, some examples of other questions are added to this list as well. First, the nine standard questions.

1. How did you experience the week of reporting?
2. Could you describe your thoughts behind the method you picked?
3. What, if anything, did you dislike about your method?
  - a. How could this be improved?
4. What did you like about your method?
5. If you would report your behaviour again, would you use the same method?
6. How do you feel about daily reporting?
7. What additional functionality could/should a phone app version of your method provide?
8. Would you consider this an average week?
9. Did the reporting task make you do things different than usual?

Second, some examples of additional questions.

1. How could it be that your morning routine takes almost three hours on average?
2. Why did you make changes to your method during the week?
3. Why did you specifically report the type of music you listened to?
4. Why did you decide not to use time indicators in your reports?

### B. ALL CLUSTERS OF ACTIVITIES

This appendix shows all discovered clusters of activities of our 8 participants. They are ordered with respect to the type of cluster, e.g., sequential, etc. Also, notes are added if applicable.

#### B.1 Sequential Clusters

1. Getting out of bed > Use the toilet > Skincare routine > Get dressed.
2. Toilet > Shower > Clean shower > Open windows > Get dressed > Moisturise > Apply deodorant > Make bed. Sometimes contains “Washing hair”.
3. Alarm > Snooze > Unplug earplugs > Listen to music on radio. Sometimes contains “Cat on bed”.
4. Get out of bed > Feed the animals.
5. Wake up > Check phone > Get out of bed > Drink water and put in contacts (Note: The participant listed this as a single activity) > Get coffee > Make and eat breakfast (while watching videos/reading articles) > Extra cup of coffee. This was also described as the average morning routine during the interview.
6. First alarm > Second alarm > waking up > 5 min on phone > Getting out of bed > Going to toilet > Getting dressed > Making breakfast >

1 glass of water > 1 slice of bread with chocolate sprinkles

Make lunch for work >

2 slices of bread with peanut butter >

Finished breakfast > Brushing my teeth > Doing my hair > Getting backpack > Put on shoes/jacket > Leave for work.

7. Wake up > Get up > Daze. From interviews we learn that this cluster also usually contains the activity “Snooze”.
8. Getting out of bed > Toilet > Skin care routine > Get dressed.

#### B.2 Simultaneous Clusters

1. Drink coffee > Eat breakfast > Read newspaper. Sometimes contains “Listening to music”, with the specified artist/radio station.

#### B.1 Hierarchical Clusters

1. Main activity: “Getting out of bed, Getting ready”, with sub-activities: “Shower, dress up, brush teeth, etc.”
2. Main activity: “Waking up”, with sub-activity: “Check social media in bed.”