

Hierarchical Task Analysis of the Process of Making a Hot Drink

Department: Loughborough Design School

Module Code: 15DSB106

Module Title: Qualitative Methods

Name of Module leader: Prof Sue Hignett

Student Name: Andrew Reece

Student ID: B416391

Student's Degree Programme: Ergonomics (Human Factors Design)

Introduction

The process of making a hot drink is something that many people do very frequently. As a common task that people are familiar with and that does not take a long time, making a hot drink (particularly tea) is used in an occupational therapy context to test and facilitate patient recovery by succeeding at a set task (Fair and Barnitt, 1999). There also appears to be a cultural influence on the procedure for making hot drinks/tea and the values surrounding them (Hannam, 1997).

With a hot drink as the end product there will almost certainly be hazards involved in the process. Hot liquid is the most obvious of these, and it is very possible that there are other hazards that would be picked up through observation and analysis of a number of people's task process. This paper aims to analyse observations of 6 people making hot drinks to determine the risks involved. On a lower priority, are likely a number of optimisations that could be found in terms of the steps taken to complete the task, something that would add up significantly over the hundreds or thousands of times that many people make hot drinks. This will be done using single-person and composite hierarchical task analyses.

Method

Participants

The participants were all either friends or family of the author, and were chosen using a purposive, heterogeneous sampling method (Robson, 2011 pp.274-275) to ensure the participants would be making a variety of different drinks in order to capture more of the possibility space (their drinks of choice were already known to the author).

Table 1: Participant information

| # | Age | Sex | Nationality | Occupation | Location |
|---|-----|-----|-------------|-------------------------------------|------------------|
| 1 | 19 | M | British | University Student (Geography) | 1 (Loughborough) |
| 2 | 22 | F | British | University Student (Geography) | 1 (Loughborough) |
| 3 | 19 | F | British | University Student (Geography) | 1 (Loughborough) |
| 4 | 20 | F | Australian | University Student (Sports Science) | 1 (Loughborough) |
| 5 | 55 | M | British | Housing Development Office | 2 (Oxfordshire) |
| 6 | 56 | F | British | Careers Advisor (self employed) | 2 (Oxfordshire) |

Locations

2 different kitchens were used: location 1 was in student housing in Loughborough and location 2 was in a semi-detached house in a village in Oxfordshire called Tackley. The major obvious difference between the 2 locations was the existence of a boiling water tap but no kettle at location 1, and vice versa at location 2. The layout of the cupboards and sinks also differed slightly between them.

Data collection - observational procedure

The participants were informed on the purpose of the study and presented with an information sheet (see Appendix B) and consent form (see Appendix C). Once they had signed the consent form, the participants were asked what drink they would be making, to confirm what was expected (if too many people were making the same drink, some would have been asked to make another drink they commonly have). They were then asked to go through the process of making their hot drink of choice, starting before they took out any of their equipment, until they had their drink ready to consume. This was filmed for later analysis on a mobile phone. The participants were thanked for their help.

Data analysis - Hierarchical Task Analysis

Task analysis in general is done in order to understand what people do when performing a task, and how they do it. The results of this are often then used to optimise the method, person or system involved (Shepherd, 1998). Hierarchical task analysis (HTA) more specifically is used as a form of representing tasks by describing them as the *operations* required to achieve a specified *goal*. These operations are recursively treated as sub-goals with operations that make them up as well (Stanton, 2006). This continues toward finer levels of granularity until the probability of failure multiplied by the cost of failure for someone following the analysis becomes acceptable (Annett et al., 1971 as cited in Stanton, 2006). This is accompanied by a plan that describes the ordering and conditional implementation of operations. (Shepherd, 1998; Shepherd and Stammers, 2005)

An HTA was used here to see the variation of operations, find opportunities to optimise the inefficiencies in the processes observed, and identify hazards. To create the individual HTAs, the recorded videos were watched, creating a hierarchy 2 levels deep. Goals that needed to be broken down further were then rewatched to do so. The HTA was then scrutinized to see if the groupings of goals could be changed to

improve the model presented. Following Stanton (2006), groupings were organised such that there were 3-8 operations for each goal, except where it made the HTA harder to read.

For the composite HTA, the elements from the individual analyses were brought together on a single page. The goals of the highest level of abstraction were used as a starting point for grouping the rest. All of the top-level goals from individual HTAs were included, duplicates were removed, and as the number of goals grew above 8, more generic abstractions were created to cover multiple. Some ordering and finer-level implementation details were omitted from the composite, as, although useful for analysing the specifics of one person's method, they would act as noise when considering the coarser-level variation between people.

In the diagrams, rectangles represent goals/operations, rounded rectangles represent plans. Goals are numbered 1 to N only in relation to their super-ordinate goals. Plan notation is shown in Table 2.

Table 2: Plan notation (modified and extended from Stanton, 2006)

| Meaning | Symbol | Usage | Further explanation |
|----------------------------------|--------|----------------------|---------------------------------------|
| then | → | 1 → 2 | |
| or | / | 1/2 | |
| any one of | : | 1:2:3 | |
| optionally do | ? | 1 → 2? | do 1, then optionally do 2 |
| is <i>condition X</i> true/false | ? | X? T → 1; → 2 | if true, do 1 then 2, otherwise, do 2 |
| if <i>condition X</i> is true | T | X? T → 1, F → 2; → 3 | if true, do 1, then 3 |
| if <i>condition X</i> is false | F | X? T → 1, F → 2; → 3 | if false, do 2, then 3 |
| (grouping) | () | 1:2:(3 → 4) | do one of 1, 2, (3 then 4) |

Results and Discussion

The resulting HTA is shown in Figure 1, with the accompanying plan in Table 3.

Most of the operations had their speed directly controlled by the participant. The exceptions to this were the kettle, the microwave, and the brewing/steeping operations. As well as taking an effectively fixed time to complete, they do not require constant attention from the participant. As a result, for the heating operations (which come earlier in the process), the participants had optimised their process already by doing other operations while the heating occurred. Other than ensuring these had finished, all the operations involved were actions.

Considering the kettle (as the archetype of this): boiling water with a kettle ends up being only minimally more hassle than using a boiling water tap; it just has to be turned on at start of process rather than 'just in time', immediately before hot water is needed. This expectation of later use requires an internalised model of the procedure or thinking ahead, presenting some cognitive load in either memory or simulation of task. It is possible that people undergoing occupational therapy may find this difficult. As previously stated, the tea-making procedure attempted during recovery is intended to be an easy win for patients. For those most familiar with a boiling water tap, or otherwise not accustomed to using a kettle often (perhaps having forgotten due to head injury), the late realisation that the kettle is needed may lessen their sense of success. Conversely, if done successfully, the time optimisation of preparing the kettle in advance and having hot water as needed may foster a greater attitude of self-efficacy (Gage and Polatajko, 1994). This is something that would require further attention from the occupational therapy arena to make more definitive statements.

One person's kitchen layout was certainly non-optimal: a rotating stool was needed to reach a required item (honey), creating a falling hazard. Solutions to this could include a stable step ladder to reach the height reduce the risk of falling; putting the

honey lower, so that it can be reached from the floor; or lowering the cupboard, so everything can be reached from the floor.

The procedures were similar between different drinks and different kitchens, e.g. everyone got the mug before they got the ingredients for the drink; everything was stored in a similar location (mugs and ingredients in cupboards, mostly high; teaspoons in drawer). The largest departure from the main procedure was for making coffee which had involved extra preparation steps for the individual ingredients. This was with pre-ground coffee, so more steps would be needed if starting with beans and grinding them when needed. The ordering was something that also varied (seemingly irrespective of drink): for some, teaspoons were retrieved at the very start, for others, only immediately before stirring. 2 people did not use teaspoons at all; 1 person (#4) used her fingers for squeezing her teabag.

Interestingly, despite their practice with making hot drinks frequently, there were some inefficiencies in the process for some participants - opening/shutting the same cupboard multiple times to take out 2 different things from same place.

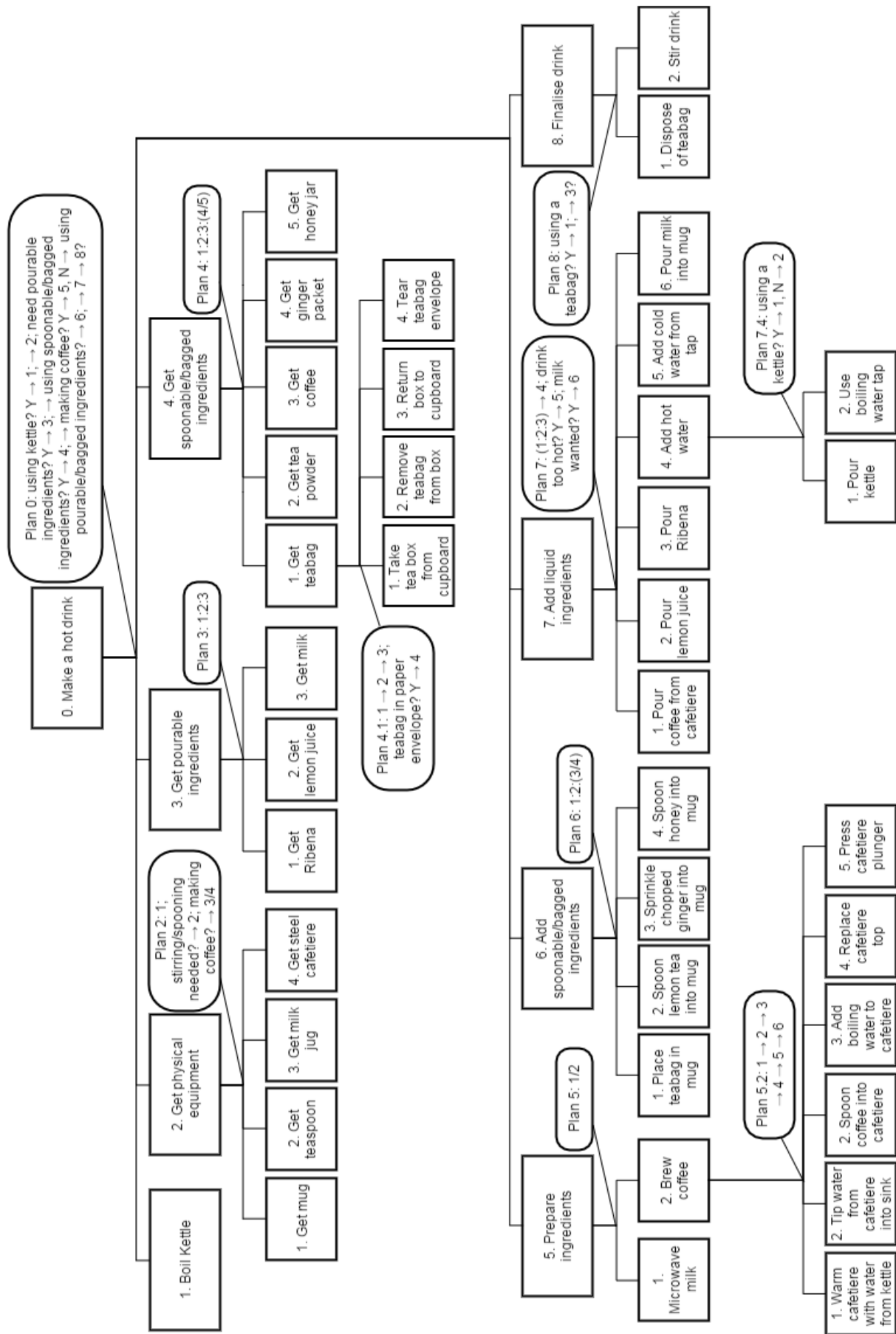


Figure 1: Composite HTA of 6 people making a hot drink

Table 3: Plan for composite HTA of 6 people making a hot drink

| Super-ordinate number | Goal Plan <hr/> Operations | Notes |
|-----------------------|---|---|
| 0. | <p><i>Make a hot drink</i> Plan 0: using kettle? Y → 1; → 2; need pourable ingredients? Y → 3; → using spoonable/bagged ingredients? Y → 4; → making coffee? Y → 5, N → using pourable/bagged ingredients? → 6; → 7 → 8?</p> <hr/> <ol style="list-style-type: none"> 1. Boil kettle 2. Get physical equipment 3. Get pourable ingredients 4. Get spoonable/bagged ingredients 5. Prepare ingredients 6. Add spoonable/bagged ingredients 7. Add liquid ingredients 8. Finalise drink | <p>1. Make sure kettle in a place where steam will not damage overhead cupboards</p> |
| 2. | <p><i>Get physical equipment</i> Plan 2: 1; stirring/spooning needed? → 2; making coffee? → 3/4</p> <hr/> <ol style="list-style-type: none"> 2.1. Get mug 2.2. Get teaspoon 2.3. Get milk jug 2.4. Get steel cafetiere | <p>2.1. Check if mug is dirty 2.1. If using a kettle, put mug nearby, so no need to move hot kettle/water</p> |
| 3. | <p><i>Get pourable ingredients</i> Plan 3: 1:2:3</p> <hr/> <ol style="list-style-type: none"> 5.1. Get Ribena 5.2. Get lemon juice 5.3. Get milk | |
| 4. | <p><i>Get spoonable/bagged ingredients</i> Plan 4: 1:2:3:(4/5)</p> <hr/> <ol style="list-style-type: none"> 4.1. Get teabag 4.2. Get tea powder 4.3. Get coffee 4.4. Get ginger packet 4.5. Get honey jar | <p>4.x. Where not tall enough, something may need to be used to gain height</p> |

- 4.1. *Get teabag*
Plan 4.1: 1 → 2 → 3; teabag in paper envelope?
Y → 4
-
- 4.1.1. Take tea box from cupboard
4.1.2. Remove teabag from box
4.1.3. Return box to cupboard
4.1.4. Tear teabag envelope
- 4.1.4. Tear at top to avoid ripping teabag
5. *Prepare ingredients*
Plan 5: 1/2
-
- 5.1. Microwave milk
5.2. Brew coffee
- 5.1. Heat so that end drink is not cold
- 5.2 *Brew coffee*
Plan 5.2: 1 → 2 → 3 → 4 → 5 → 6
-
- 5.2.1. Warm cafetiere with water from kettle
5.2.2. Tip water from cafetiere into sink
5.2.3. Spoon coffee into cafetiere
5.2.4. Add boiling water to cafetiere
5.2.5. Replace cafetiere lid
5.2.6. Press cafetiere plunger
- 5.2.1. Kettle boiled by this point. Also to make sure water is below 100°C.
5.2.4. Wait for coffee to brew to taste.
6. *Add spoonable/bagged ingredients*
Plan 6: 1:2:(3/4)
-
- 6.1. Place teabag in mug
6.2. Spoon lemon tea into mug
6.3. Sprinkle chopped ginger into mug
6.4. Spoon honey into mug
7. *Add liquid ingredients*
Plan 7: (1:2:3) → 4; drink too hot? Y → 5; milk wanted? Y → 6
-
- 7.1. Pour coffee from cafetiere
7.2. Pour lemon juice
7.3. Pour Ribena
7.4. Add hot water
7.5. Add cold water from tap
7.6. Pour milk into mug
- 7.4. *Add hot water*
Plan 7.4: using a kettle? Y → 1, N → 2
-
- 7.4.1. Pour kettle
7.4.2. Use boiling water tap
- 7.4.1 Kettle boiled by this point.

| | |
|-----------------------|-------------------------------------|
| <i>Finalise drink</i> | |
| 8. | Plan 8: using a teabag? Y → 1; → 3? |
| 8.1. | Dispose of teabag |
| 8.2. | Stir drink |
| 8.1. | Wait for tea to steep to taste |
| 8.1. | Compostable. |

Conclusion

Although this study has not captured the full possibility space of making hot drinks, it provides a cross-section of a range of procedures in 2 locations with different equipment. When making a hot drink, tasks can be done in a variety of orders to achieve a similar result. The most important operations in terms of timing are those that involve heating ingredients: boiling water in a kettle and microwaving milk - these should be done as early as possible, so that they are finished as soon as they are needed. Although many people clearly have preferences for the intended result, if a person wanted a hot drink with no particular preference, hot Ribena or hot lemon tea can be made with minimal hassle. Even regular hot-drink makers may well be able to improve the layout of their kitchen or optimise their behaviour to make the process easier.

Word Count: 1494

References

Fair, A. and Barnitt, R., 1999. Making a cup of tea as part of a culturally sensitive service. *The British Journal of Occupational Therapy*, 62(5), pp.199-205.

Gage, M. and Polatajko, H., 1994. Enhancing occupational performance through an understanding of perceived self-efficacy. *American Journal of Occupational Therapy*, 48(5), pp.452-461.

Hannam, D., 1997. More than a cup of tea: Meaning construction in an everyday occupation. *Journal of Occupational Science*, 4(2), pp.69-73.

Robson, C. 2011. *Real world research*. Chichester, West Sussex: Wiley.

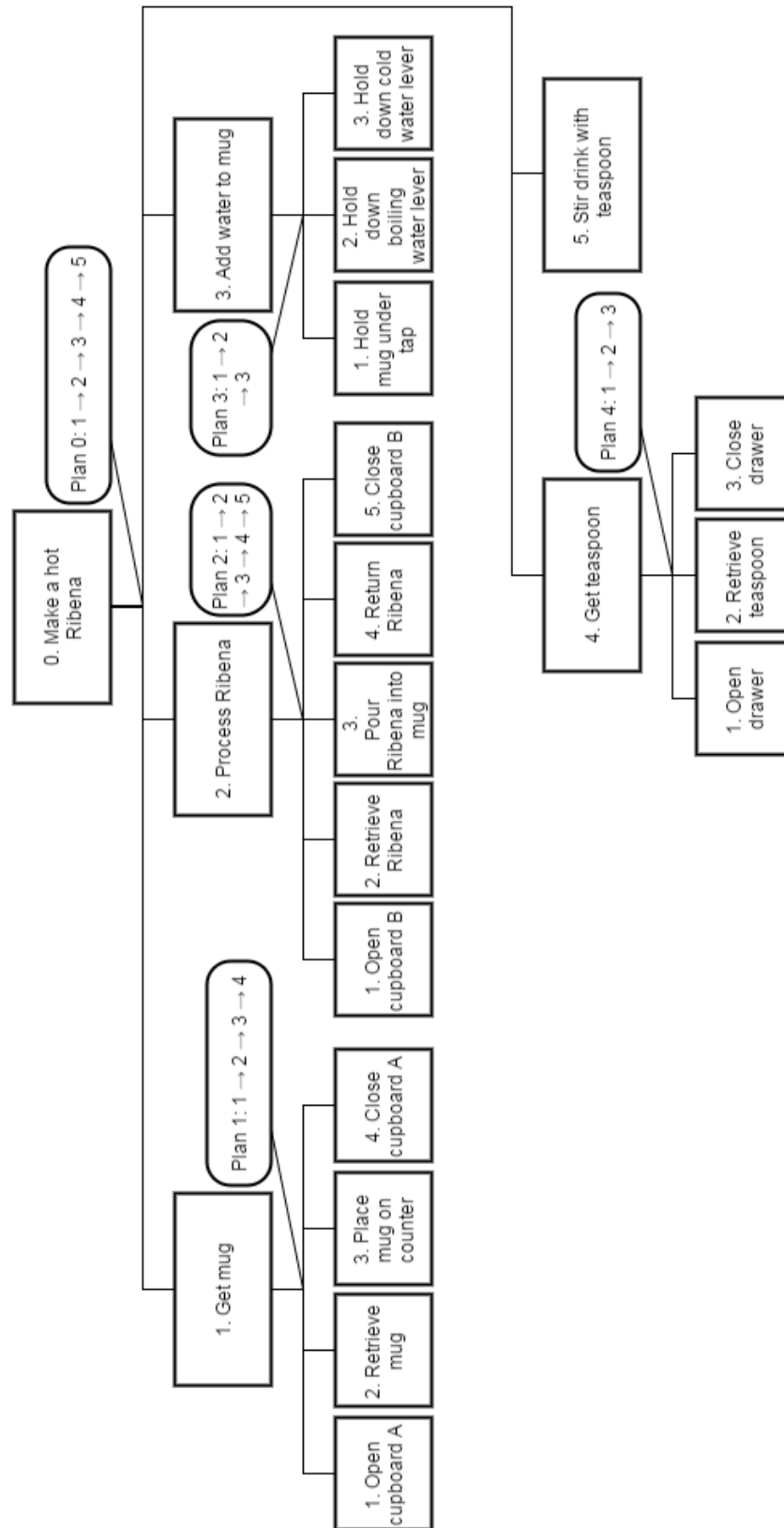
Shepherd, A., 1998. HTA as a framework for task analysis. *Ergonomics*, 41(11), pp.1537-1552.

Shepherd, A. and Stammers, R. 2005. Task Analysis. In: Wilson, J. and Corlett, N., ed., *Evaluation of Human Work*, 3rd ed. Boca Raton, FL: Taylor & Francis.

Stanton, N.A., 2006. Hierarchical task analysis: Developments, applications, and extensions. *Applied ergonomics*, 37(1), pp.55-79.

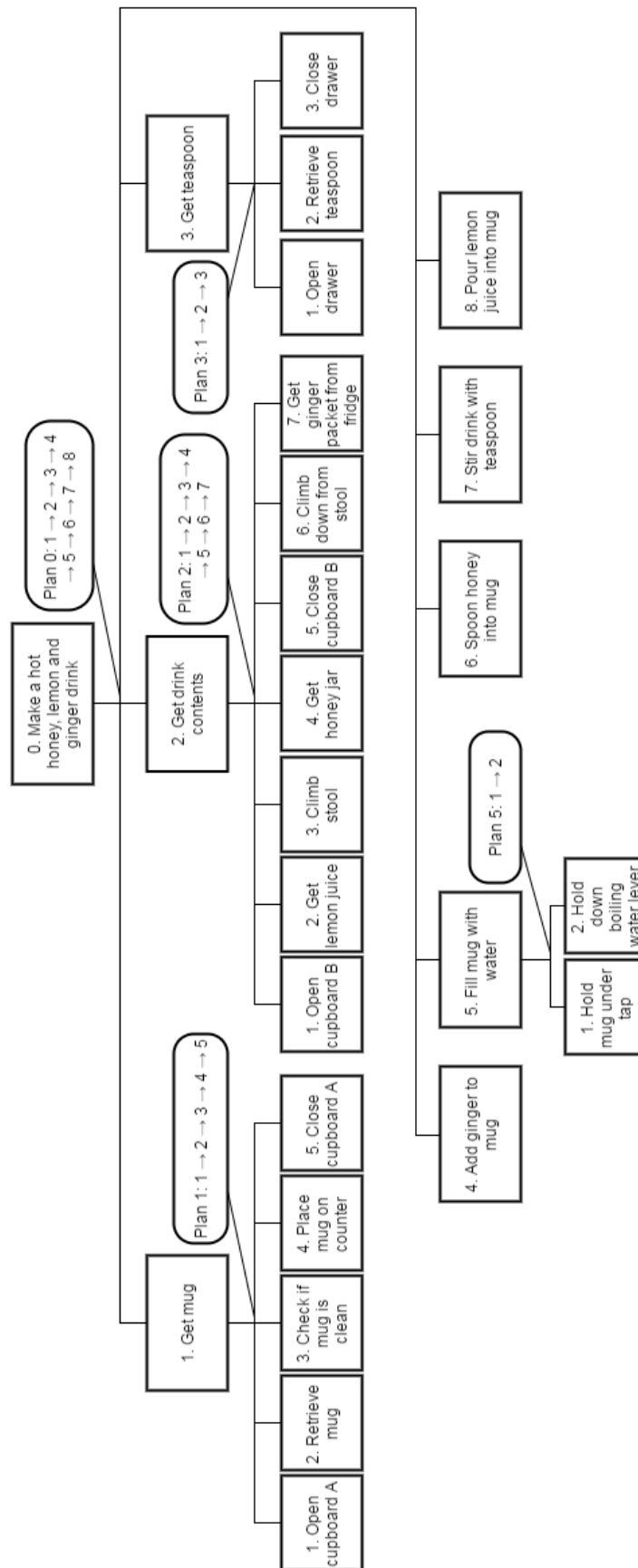
Appendix A: Individual Task Analyses

1: Hot Ribena in Location 1



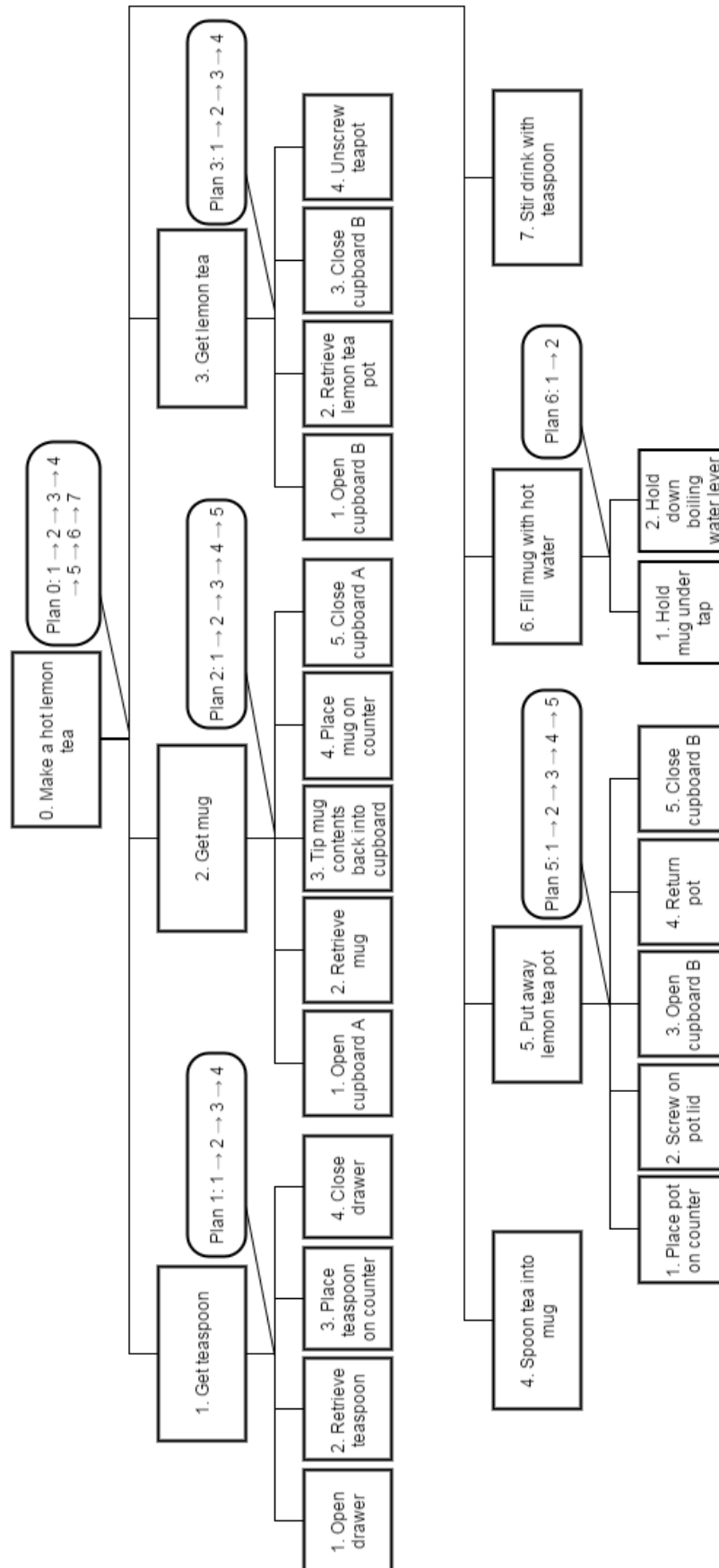
| Super-ordinate number | <i>Goal</i> Plan | Operations | Notes |
|-----------------------|---|--|----------------------------|
| 0. | <i>Make a hot Ribena</i> Plan 0: 1 → 2 → 3 → 4 → 5 | <hr/> 1. Get mug 2. Process Ribena 3. Add water to mug 4. Get teaspoon 5. Stir drink with teaspoon | |
| 1. | <i>Get mug</i> Plan 1: 1 → 2 → 3 → 4 | <hr/> 1.1. Open cupboard 1.2. Retrieve mug 1.3. Place mug on counter 1.4. Close cupboard | |
| 2. | <i>Process Ribena</i> Plan 2: 1 → 2 → 3 → 4 → 5 | <hr/> 2.1. Open cupboard 2.2. Retrieve Ribena 2.3. Pour Ribena into mug 2.4. Return Ribena 2.5. Close cupboard | |
| 3. | <i>Add water to mug</i> Plan 3: 1 → 2 → 3 | <hr/> 3.1. Hold mug under tap 3.2. Hold down boiling water lever 3.3. Hold down cold water lever | 3.2. fills most of the mug |

2: Hot honey, lemon and ginger drink in Location 1



| Super-ordinate number | <i>Goal</i> Plan Operations | Notes |
|-----------------------|--|-------|
| 0. | <i>Make a hot honey, lemon and ginger drink</i> Plan 0: 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 | |
| | <ul style="list-style-type: none"> 1. Get mug 2. Get drink contents 3. Get teaspoon 4. Add ginger to mug 5. Fill mug with water 6. Spoon honey into mug 7. Stir drink 8. Pour lemon juice into mug | |
| 1. | <i>Get mug</i> Plan 1: 1 → 2 → 3 → 4 → 5 | |
| | <ul style="list-style-type: none"> 1.1. Open cupboard 1.2. Retrieve mug 1.3. Check mug is clean 1.4. Place mug on counter 1.5. Close cupboard | (l) |
| 2. | <i>Get drink contents</i> Plan 2: 1 → 2 → 3 → 4 → 5 → 6 → 7 | |
| | <ul style="list-style-type: none"> 2.1. Open cupboard 2.2. Get lemon juice 2.3. Climb stool 2.4. Get honey jar 2.5. Close cupboard 2.6. Climb down from stool 2.7. Get ginges packet from fridge | |
| 3. | <i>Get teaspoon</i> Plan 3: 1 → 2 → 3 | |
| | <ul style="list-style-type: none"> 3.1. Open drawer 3.2. Retrieve teaspoon 3.3. Close drawer | |
| 5. | <i>Fill mug with water</i> Plan 5: 1 → 2 | |
| | <ul style="list-style-type: none"> 5.1. Hold mug under tap 5.2. Hold down boiling water lever | |

3: Hot lemon tea in Location 1



| Super-ordinate number | <i>Goal</i> Plan | Notes |
|-----------------------|--|-------|
| Operations | | |
| 0. | <i>Make a hot lemon tea</i> Plan 0: 1 → 2 → 3 → 4 → 5 → 6 → 7 | |
| | <ul style="list-style-type: none"> 1. Get teaspoon 2. Get mug 3. Get lemon tea 4. Spoon tea into mug 5. Put away lemon tea pot 6. Fill mug with hot water 7. Stir drink with teaspoon | |
| 1. | <i>Get teaspoon</i> Plan 1: 1 → 2 → 3 → 4 | |
| | <ul style="list-style-type: none"> 1.1. Open drawer 1.2. Retrieve teaspoon 1.3. Place teaspoon on counter 1.4. Close drawer | |
| 2. | <i>Get mug</i> Plan 2: 1 → 2 → 3 → 4 → 5 | |
| | <ul style="list-style-type: none"> 2.1. Open cupboard 2.2. Retrieve mug 2.3. Tip mug contents back into cupboard 2.4. Place mug on counter 2.5. Close cupboard | |
| 3. | <i>Get lemon tea</i> Plan 3: 1 → 2 → 3 → 4 | |
| | <ul style="list-style-type: none"> 3.1. Open cupboard 3.2. Retrieve lemon tea pot 3.3. Close cupboard 3.4. Unscrew tea pot | |
| 5. | <i>Put away lemon tea pot</i> Plan 5: 1 → 2 → 3 → 4 → 5 | |
| | <ul style="list-style-type: none"> 5.1. Place pot on counter 5.2. Screw on pot lid 5.3. Open cupboard 5.4. Return pot 5.5. Close cupboard | |

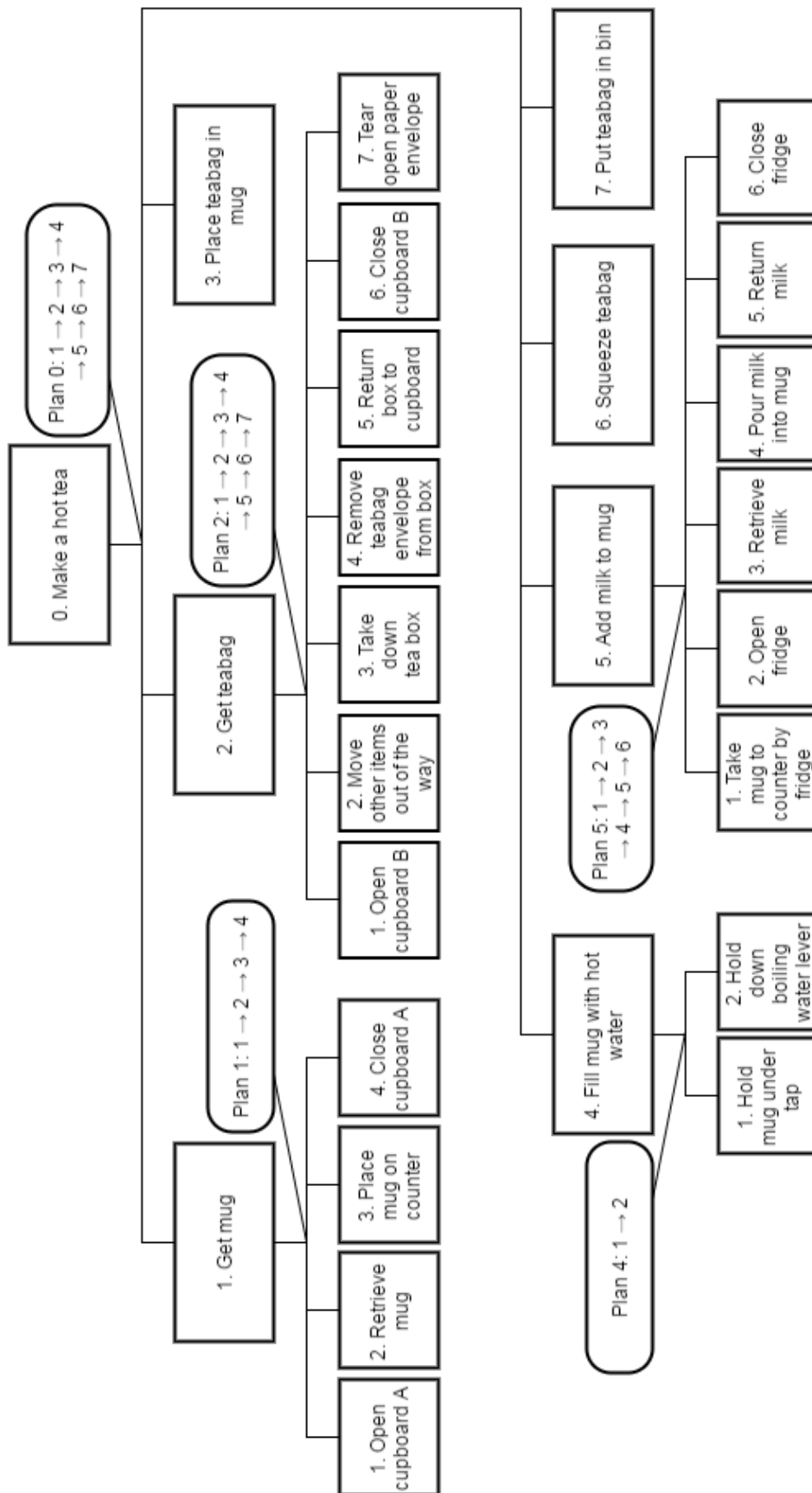
6. *Fill mug with hot water*

Plan 6: 1 → 2

6.1. Hold mug under tap

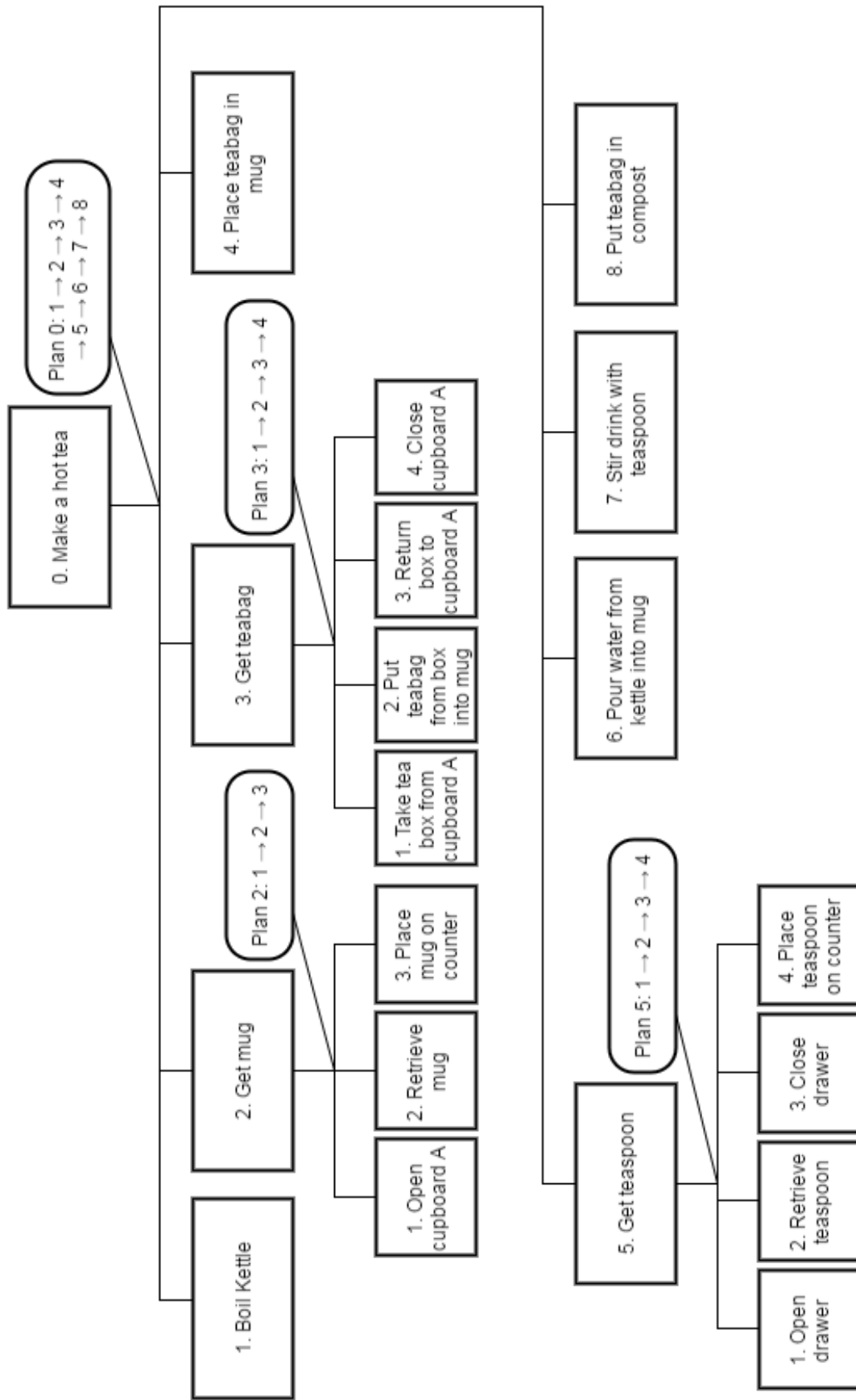
6.2. Hold down boiling water lever

4: Hot tea in Location 1



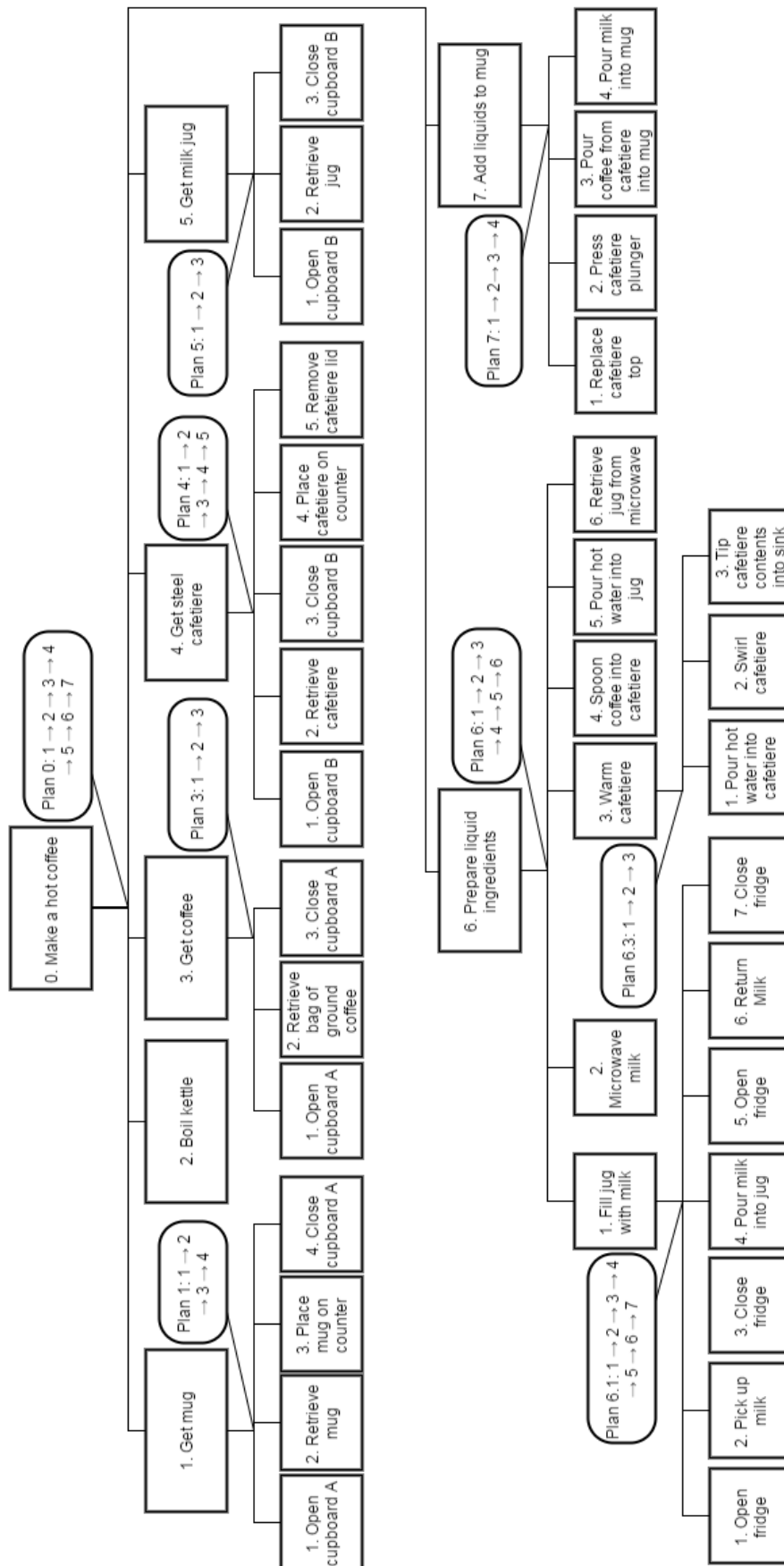
| Super-ordinate number | <i>Goal Plan</i> Operations | Notes |
|-----------------------|---|-------|
| 0. | <i>Make a hot tea</i> Plan 0: 1 → 2 → 3 → 4 → 5 → 6 → 7 | |
| | <ol style="list-style-type: none"> 1. Get mug 2. Get teabag 3. Place teabag in mug 4. Fill mug with hot water 5. Add milk to mug 6. Squeeze teabag 7. Put teabag in bin | |
| 1. | <i>Get mug</i> Plan 1: 1 → 2 → 3 → 4 | |
| | <ol style="list-style-type: none"> 1.1. Open cupboard 1.2. Retrieve mug 1.3. Place mug on counter 1.4. Close cupboard | |
| 2. | <i>Get teabag</i> Plan 2: 1 → 2 → 3 → 4 → 5 → 6 → 7 | |
| | <ol style="list-style-type: none"> 2.1. Open cupboard 2.2. Move other items out of the way 2.3. Take down tea box 2.4. Remove teabag envelope from box 2.5. Return box to cupboard 2.6. Close cupboard 2.7. Tear open paper envelope | |
| 4. | <i>Add water to mug</i> Plan 4: 1 → 2 | |
| | <ol style="list-style-type: none"> 4.1. Hold mug under tap 4.2. Hold down boiling water lever | |
| 5. | <i>Add milk to mug</i> Plan 5: 1 → 2 → 3 → 4 → 5 → 6 | |
| | <ol style="list-style-type: none"> 5.1. Take mug to counter by fridge 5.2. Open fridge 5.3. Retrieve milk 5.4. Pour milk into mug 5.5. Return milk 5.6. Close fridge | |

5: Hot tea in Location 2



| Super-ordinate number | Goal Plan Operations | Notes |
|-----------------------|--|---|
| 0. | <p><i>Make a hot tea</i> Plan 0: 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8</p> <hr/> <p>1. Boil kettle 2. Get mug 3. Get teabag 4. Place teabag in mug 5. Get teaspoon 6. Pour water from kettle into mug 7. Stir drink with teaspoon 8. Put teabag in compost</p> | 1. Kettle moved so steam does not damage wooden cupboards above |
| 2. | <p><i>Get mug</i> Plan 2: 1 → 2 → 3</p> <hr/> <p>2.1. Open cupboard 2.2. Retrieve mug 2.3. Place mug on counter</p> | 2.3. Mug placed very near kettle, minimising later distance travelled |
| 3. | <p><i>Get teabag</i> Plan 3: 1 → 2 → 3 → 4</p> <hr/> <p>3.1. Take tea box from cupboard 3.2. Put teabag from box into mug 3.3. Return box to cupboard 3.4. Close cupboard</p> | 3.1. Tea box is not put down |
| 5. | <p><i>Get teaspoon</i> Plan 3: 1 → 2 → 3 → 4</p> <hr/> <p>5.1. Open drawer 5.2. Retrieve teaspoon 5.3. Close drawer 5.4. Place teaspoon on counter</p> | |

6: Hot coffee in Location 2



| Super-ordinate number | <i>Goal</i> Plan | Notes |
|-----------------------|--|-------|
| | Operations | |
| 0. | <i>Make a hot coffee</i> Plan 0: 1 → 2 → 3 → 4 → 5 → 6 → 7 | |
| | <ul style="list-style-type: none"> 1. Get mug 2. Boil kettle 3. Get coffee 4. Get steel cafetiere 5. Get milk jug 6. Prepare liquid ingredients 7. Add liquids to mug | |
| 1. | <i>Get mug</i> Plan 1: 1 → 2 → 3 → 4 | |
| | <ul style="list-style-type: none"> 1.1. Open cupboard 1.2. Retrieve mug 1.3. Place mug on counter 1.4. Close cupboard | |
| 3. | <i>Get coffee</i> Plan 3: 1 → 2 → 3 | |
| | <ul style="list-style-type: none"> 3.1. Open cupboard 3.2. Retrieve bag of ground coffee 3.3. Close cupboard | |
| 4. | <i>Get steel cafetiere</i> Plan 4: 1 → 2 → 3 → 4 → 5 | |
| | <ul style="list-style-type: none"> 4.1. Open cupboard 4.2. Retrieve cafetiere 4.3. Close cupboard 4.4. Place cafetiere 4.5. Remove cafetiere lid | |
| 5. | <i>Get milk jug</i> Plan 5: 1 → 2 → 3 | |
| | <ul style="list-style-type: none"> 5.1. Open cupboard 5.2. Retrieve jug 5.3. Close cupboard | |

6. *Prepare liquid ingredients*
Plan 6: 1 → 2 → 3 → 4 → 5 → 6

- 6.1. Fill jug with milk
- 6.2. Microwave milk
- 6.3. Warm cafetiere
- 6.4. Spoon coffee into cafetiere
- 6.5. Pour hot water into jug
- 6.6. Retrieve jug from microwave

6.1. *Fill jug with milk*
Plan 6.1: 1 → 2 → 3 → 4 → 5 → 6 → 7

- 6.1.1. Open fridge
- 6.1.2. Pick up milk
- 6.1.3. Close fridge
- 6.1.4. Pour milk into jug
- 6.1.5. Open fridge
- 6.1.6. Return milk
- 6.1.7. Close fridge

6.3. *Warm cafetiere*
Plan 6.3: 1 → 2 → 3

- 6.3.1. Pour hot water into cafetiere
- 6.3.2. Swirl cafetiere
- 6.3.3. Tip cafetiere contents into sink

7. *Add liquids to mug*
Plan 7: 1 → 2 → 3 → 4

- 7.1. Replace cafetiere top
 - 7.2. Press cafetiere plunger
 - 7.3. Pour coffee from cafetiere into mug
 - 7.4. Pour milk into mug
-

Appendix B: Participant information sheet

Dear Participant

I am carrying out a research study for my coursework on the module 14DSB106 (Qualitative Methods) in Loughborough Design School, Loughborough University. The purpose of the study is to look at the task of *'making a hot drink'*. Your participation will consist of:

- Observation of activities when carrying out the process of making a hot drink for a period of less than 5 minutes. The data will be recorded for analysis. All the information will be confidential and will be deleted after analysis. All references and images used in the coursework will be anonymous.

If you want further information about the coursework, you can contact the module organiser, Prof. Sue Hignett (S.M.Hignett@lboro.ac.uk).

Yours faithfully,

Andrew Reece

a.z.m.reece-14@student.lboro.ac.uk

Appendix C: Consent form

The purpose and details of this study have been explained to me. I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the Loughborough University Ethical Approvals (Human Participants) Sub-Committee.

I have read and understood the information sheet and this consent form.

I have had an opportunity to ask questions about my participation.

I understand that I am under no obligation to take part in the study.

I understand that I have the right to withdraw from this study at any stage for any reason, and that I will not be required to explain my reasons for withdrawing.

I understand that all the information I provide will be treated in strict confidence and will be kept anonymous and confidential to the researchers unless (under the statutory obligations of the agencies which the researchers are working with), it is judged that confidentiality will have to be breached for the safety of the participant or others.

I agree to participate in this study.

Your name _____

Your signature _____

Signature of investigator _____

Date _____