Exploratory analyses for 7 children's data

4YellowRound; 4Red; 2DarkRed; 3Orange; 1transparent

In this group of 7 children, Age range: 7-10, average = 8.14, 5 boys and 2 girls.

General observations:

1) **The bricks first looked at?**

The bricks that are most frequently looked at first in BUILD1 are the yellow round bricks. Overall ALL builds, the 3 orange bricks were looked at first most often. By BUILD3 there is little difference in which bricks are looked at first.

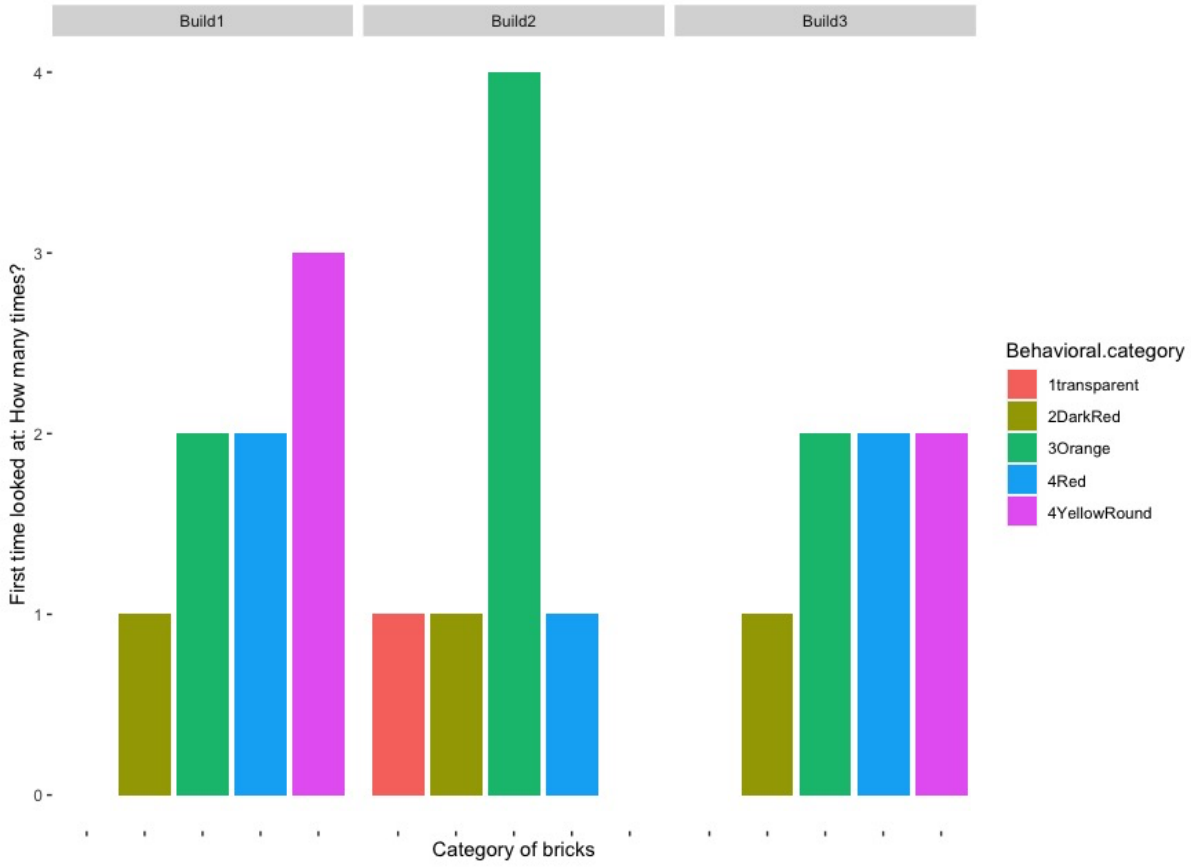


Fig 1. The frequency each brick type is looked at first

- The transparent is rarely looked at first. This is opposed to some of our original findings, where special “affordance” bricks seemed to capture attention. Perhaps the nature of this task, ‘build a vehicle’, leads children to first consider common bricks for this purpose. But it could equally be that because it is transparent it isn’t noticed quickly. This would also be interesting because the feature that makes it special (transparency) actually detracts from its noticeability.
- The 2 dark red bricks are not often looked at first initially compared to other bricks, which is revealing since they could be thought of as a foundation of a vehicle.

2) The first time each brick type is looked at, what is the duration of that fixation?

-First fixation duration over participants (often used as a measure of surprise) generally declines from BUILD1-3, as participants attenuate, or the novelty of the bricks wears off. Although small, the 4Red bricks which allow perpendicular attachments receive the highest first fixation durations in BUILD1. Once they are seen they are inspected preferentially. This matches very well with what was observed in the coding of the videos (and overall counting of looks in Fig.3, below). These bricks seem to have some special properties which the children realise when they first encounter them, and continue to persistently engage with over the course of building. Children look many times at the 4Red bricks because often they are the connectors between other types of bricks.

-The 4YellowRound bricks also receive high first fixations durations in BUILD1, these were also the bricks which were most commonly looked at first in BUILD1.

-Although the 3Orange bricks are looked at first most often over all builds, there is little change in the durations of the first fixations they receive from BUILD 1-3. Whereas there appears to be an interaction in that the preferential attention granted to the 4YellowRound and 4Red bricks declines from BUILD 1-3.

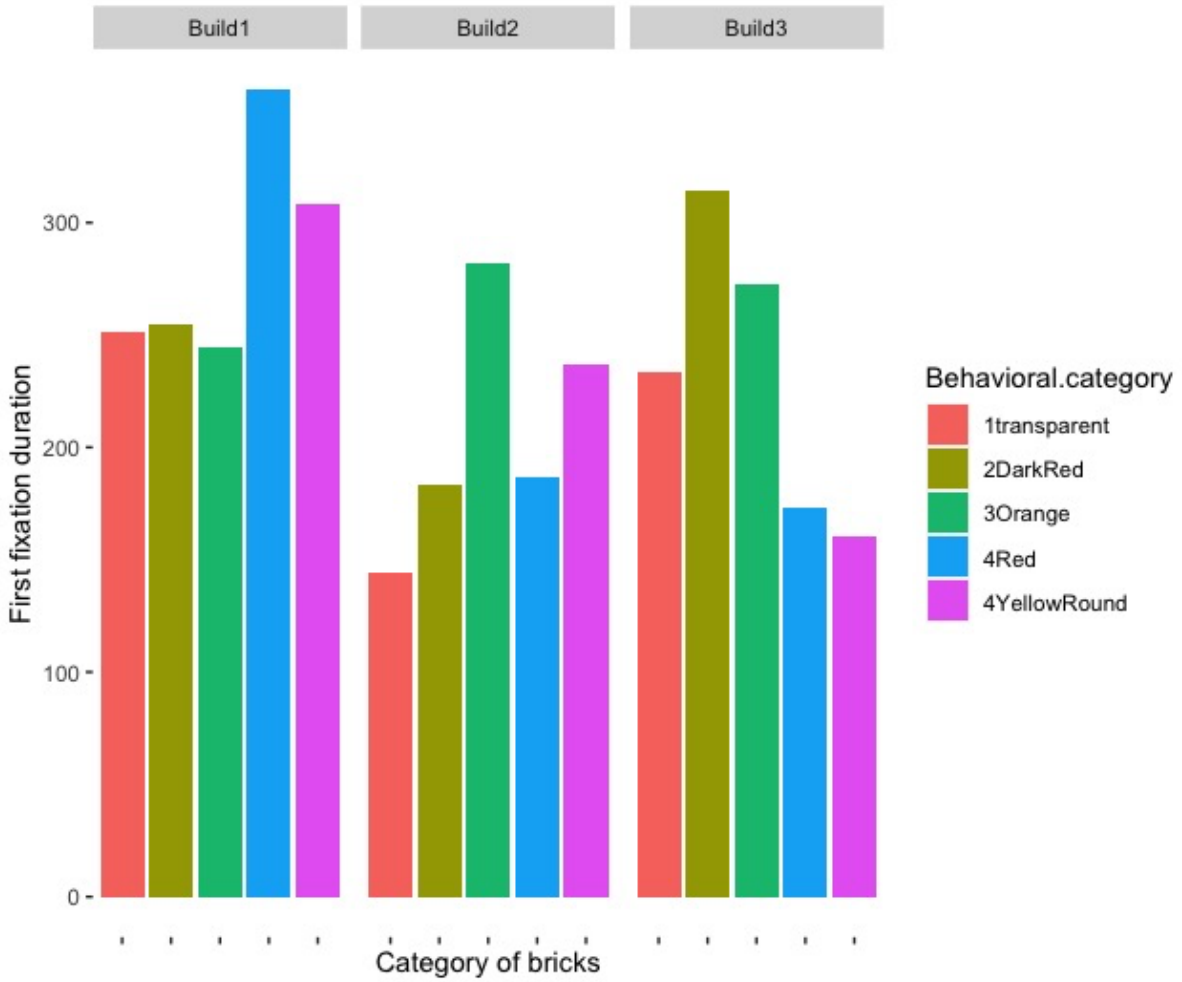
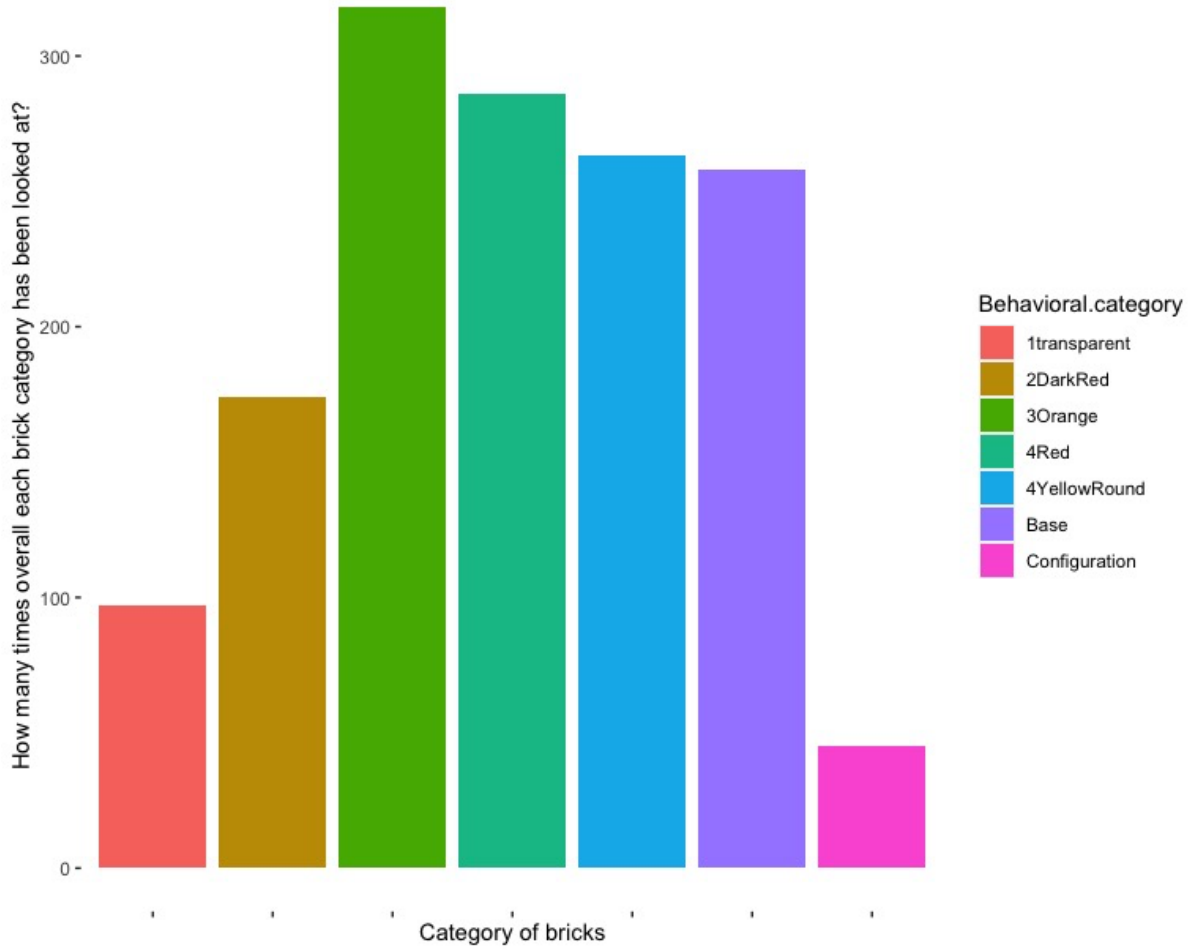


Fig 2. Duration of first fixation on each brick type

3) How many times is each brick category looked at overall? The number of times in total each brick category has been looked at, summed over all builds?

The 3Orange bricks are looked at most overall (as well as first most often, Fig.1). Also mirroring Fig 1, the transparent brick is rarely looked at first nor looked at over the course of the building processes.


How many times overall each brick category has been looked at?
300
200
100
0
Category of bricks
Behavioral.category
1transparent
2DarkRed
3Orange
4Red
4YellowRound
Base
Configuration

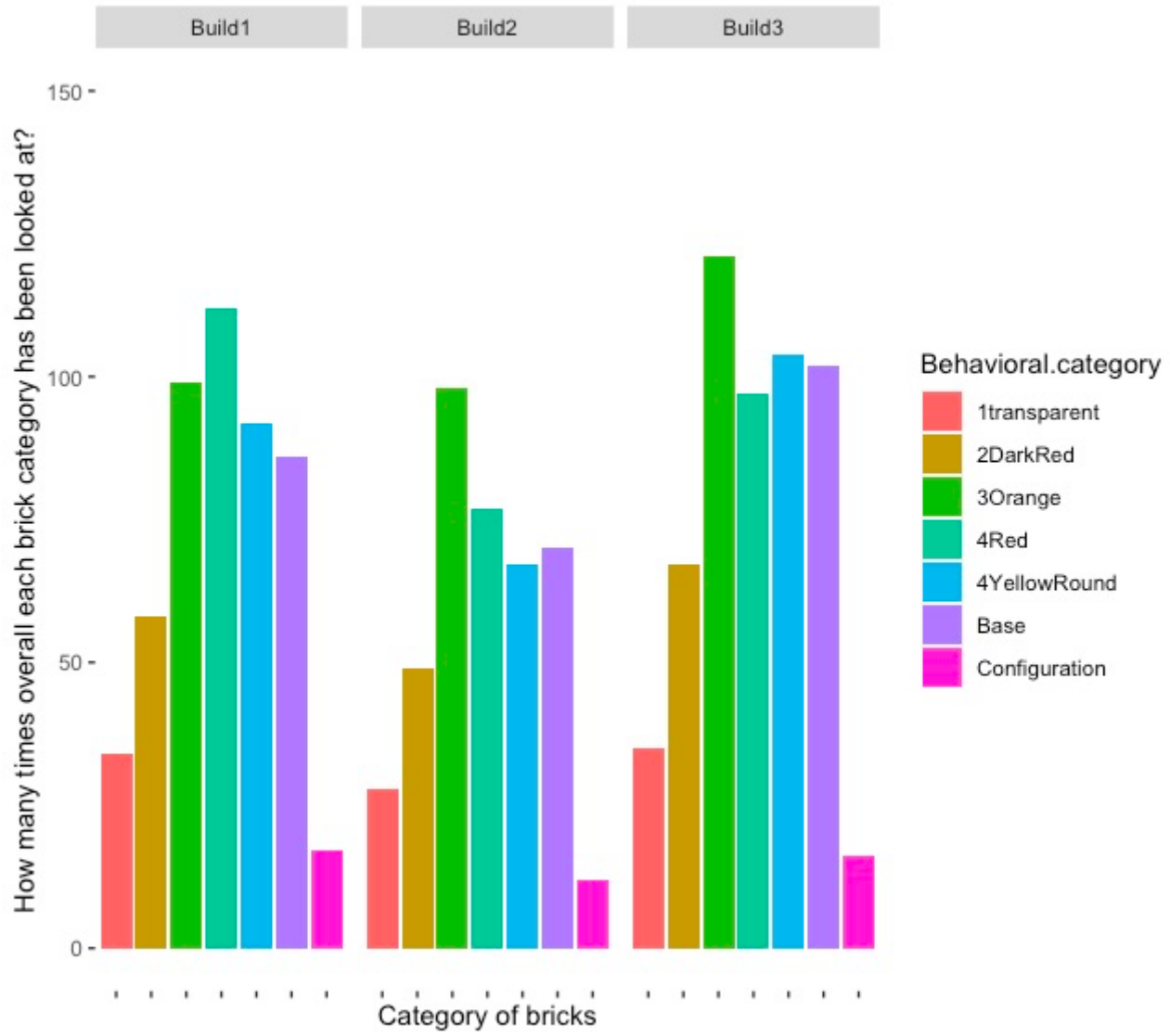


Fig. 3 The number of times in total each brick category has been looked at, for each build.

Summary and main points from looking data

-There seems to be something persistent about the 3Orange bricks: Over all builds they are most often looked at first, and continue to be looked at most often. But there is little change from builds 1-3.

-In terms of attention capturing qualities when initially encountered in BUILD1, the 4YellowRound are most often looked at first, and also receive high first fixation durations. However these measures decrease over builds 1-3. Nevertheless these bricks are consistently looked at in each build even though their “novelty” appears to decrease.

- The 4red bricks with perpendicular connectors also stand out in terms of attention capturing qualities in BUILD1. Once they are noticed they receive the highest first fixation durations. Once their special properties have been initially assessed however first fixation durations also decrease from builds 1-3. This does not detract from how often they are looked at overall however; they remain one of the most frequently looked at bricks over all

builds. Like with 4YellowRound, there seems to be something special about the 4Red bricks which requires more processing the first time they are noticed - this information is retained however, and they are frequently returned to throughout.

4) How many times is each brick category used overall?

There are differences between which bricks are looked at most and which are used most. But keep in mind some bricks have more occurences than others. For example, there are four yellow round bricks, but only 1 transparent brick (this may also influence some of the interpretations drawn above about the transparent brick).

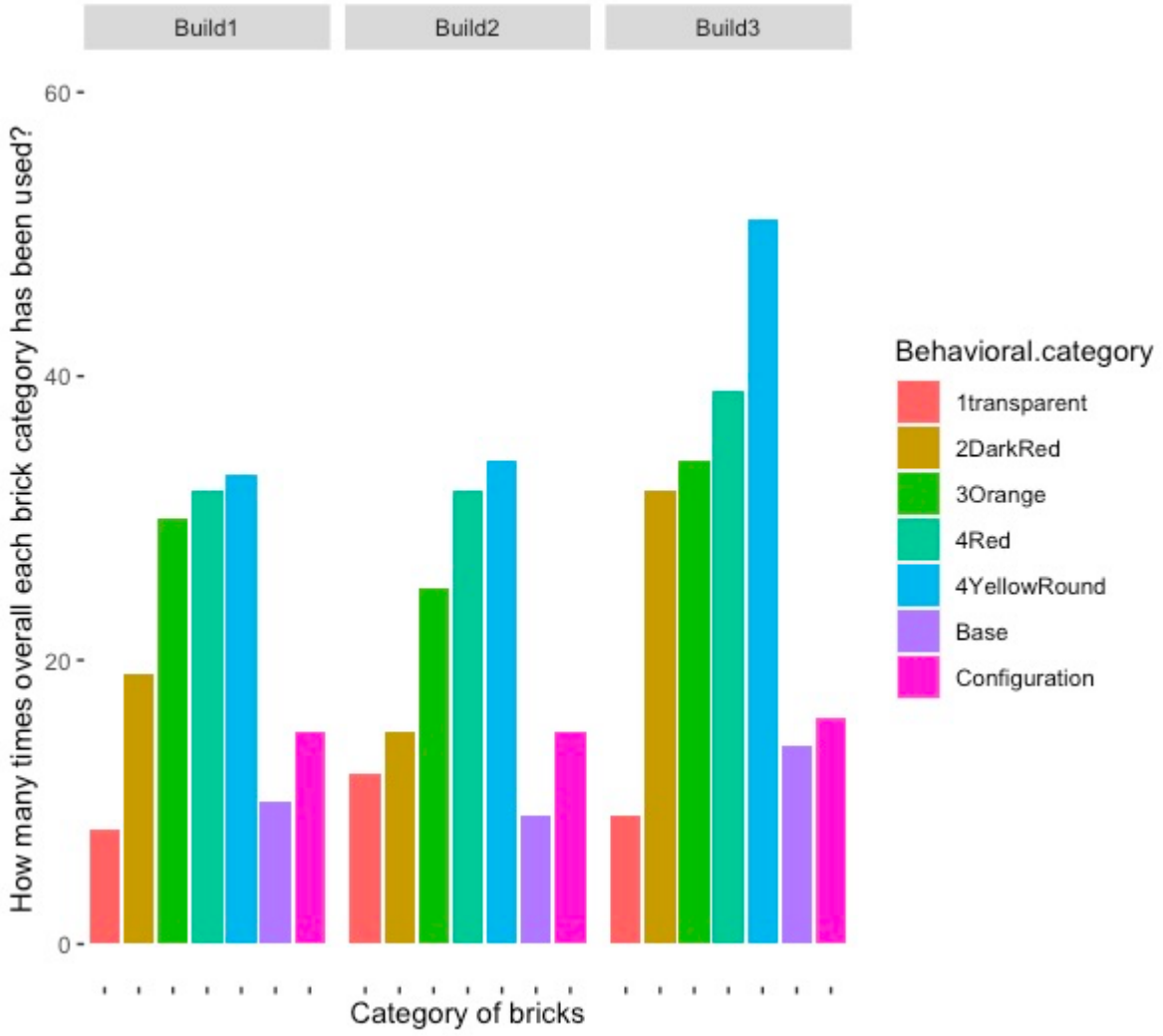
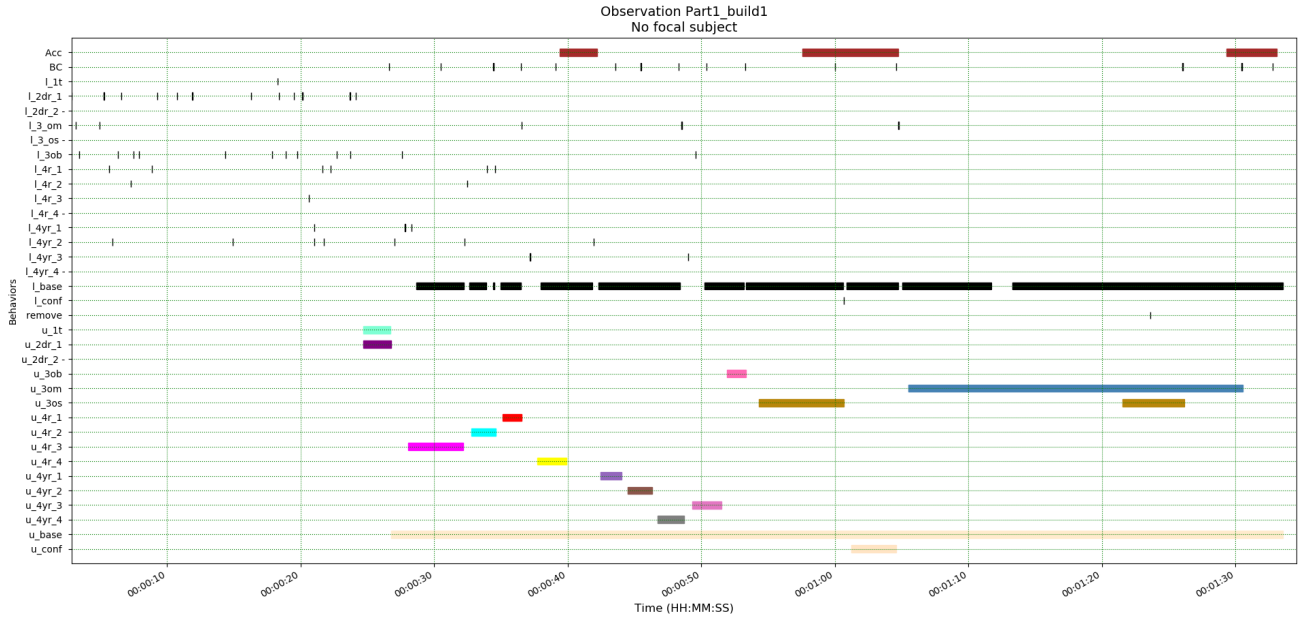
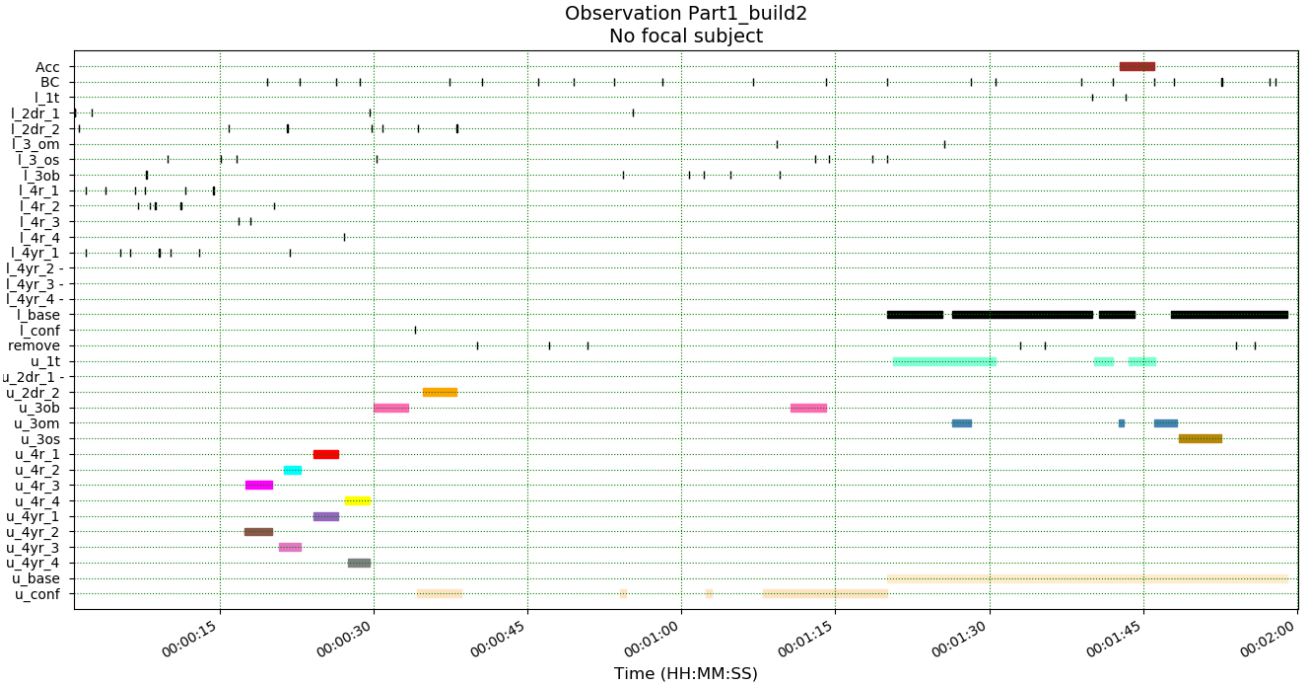
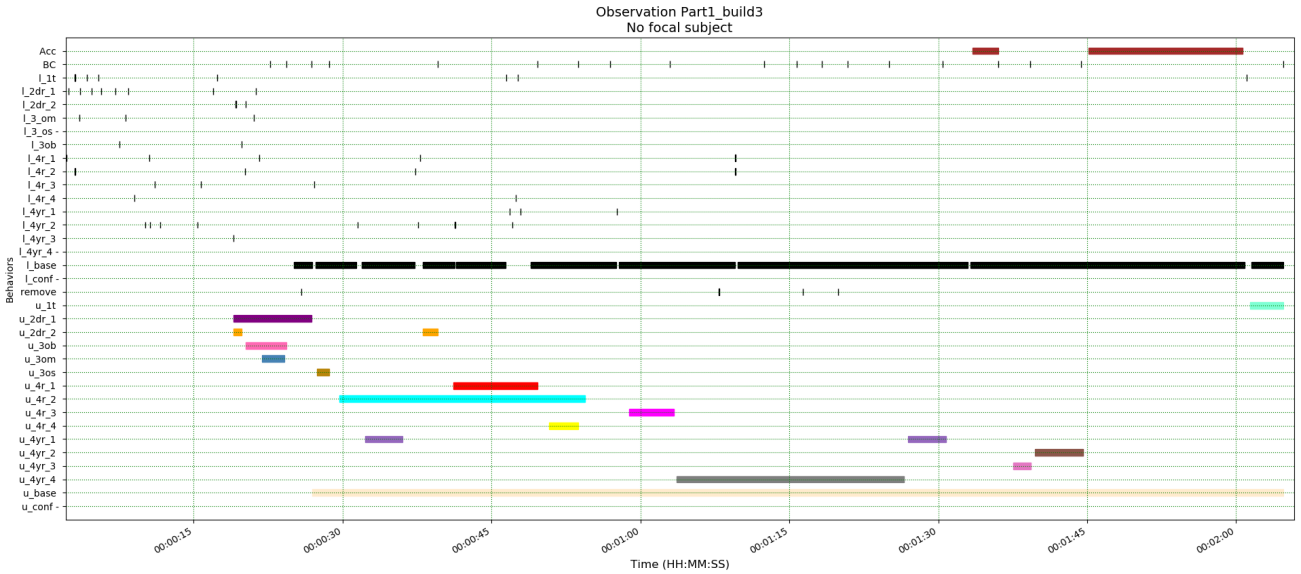


Fig. 4 The number of times in total each brick category has been used, across each build.

5) The time-series of looking and using behaviour (example participant)






Observation Part1_build3
No focal subject
Acc
BC
l_1t
l_2dr_1
l_2dr_2
l_3_om
l_3_os -
l_3ob
l_4r_1
l_4r_2
l_4r_3
l_4r_4
l_4yr_1
l_4yr_2
l_4yr_3
l_4yr_4 -
l_base
l_conf -
remove
u_1t
u_2dr_1
u_2dr_2
u_3ob
u_3om
u_3os
u_4r_1
u_4r_2
u_4r_3
u_4r_4
u_4yr_1
u_4yr_2
u_4yr_3
u_4yr_4
u_base
u_conf -
Behaviors
00:00:15
00:00:30
00:00:45
00:01:00
00:01:15
00:01:30
00:01:45
00:02:00
Time (HH:MM:SS)