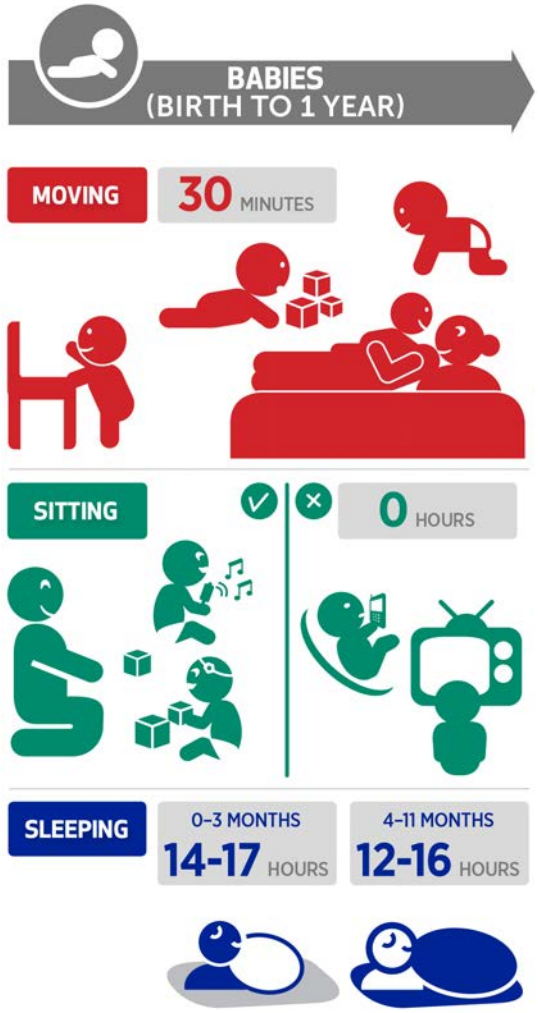
# Movement behaviours and parenting in the first two years of life

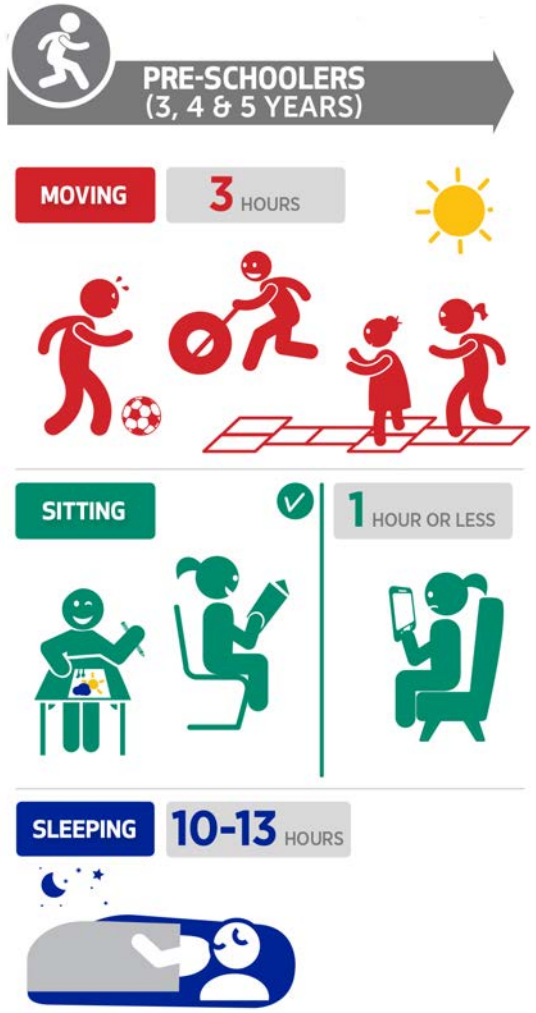
Dr Alessandra Prioreschi

DPHRU
MRC/Wits Developmental Pathways for Health Research Unit
saMRC advancinglife

# Movement behaviours



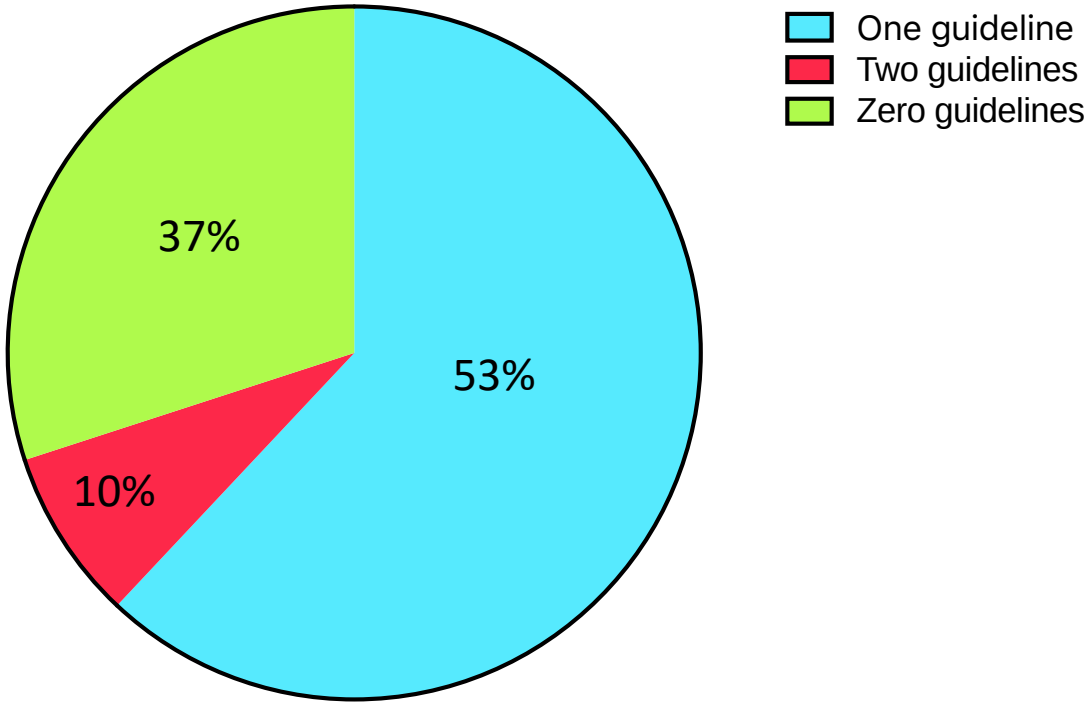


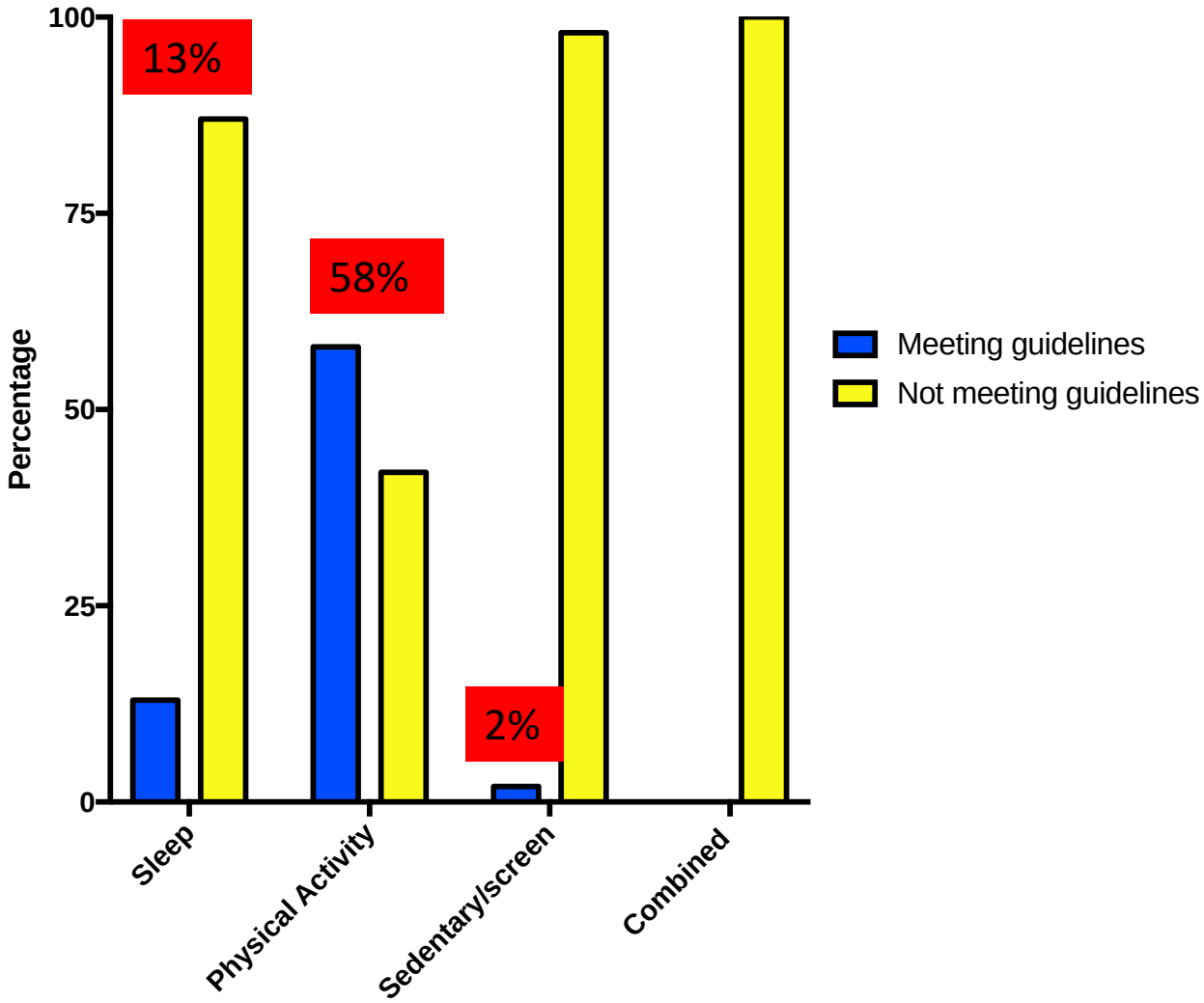



# South African movement guidelines for the early years

# Percentage of infants meeting guidelines (0-2years)

## *Maternal Reported Data*



# Compliance with guidelines

**Physical Activity**

- Meeting PA guideline was associated with higher subcutaneous adipose fat, but not with higher BMI.
- Males met more guidelines than females, and were more likely to meet the physical activity guideline
- Infant tummy time ranged from 2-30 min/day (mean of 15 min/day)
- Toddler active time ranged from 120-240 min/day (mean of 151 min/day)

**Sedentary and Screen time**

- Only 2% met the sedentary time guideline, and this was largely driven by screen time.
- Time restrained ranged from 58-210 min/day (mean of 110 min/day)
- Screen time ranged from 10-60 min/day (mean of 30 min/day)

**Sleep**

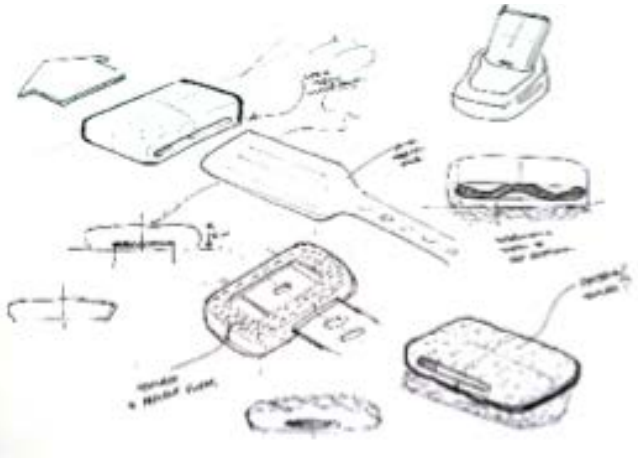
- Meeting the sleep guideline was associated with higher subcutaneous adipose fat, but not with higher BMI.
- Sleep time was on average 10.21hours/night

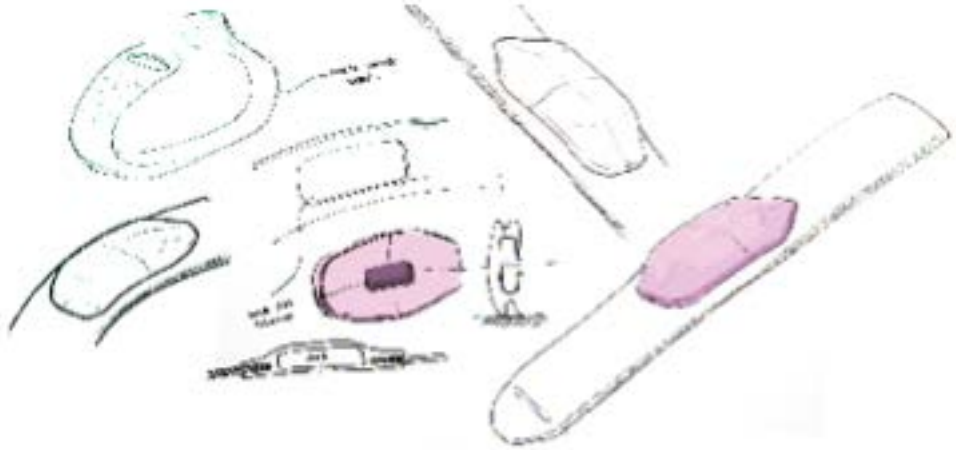
# Difficulties with assessing physical activity objectively in the first two years

- Sporadic activities
- Regular naps
- Developmental stages
- Subjective measures may miss this
- Accelerometer placement and wear time need to be relevant
- Cut points vary
- Caregiver influences on data (up to 55% observed)
- Feasibility of devices


# Aims

- To design a reusable wrist-worn band for the Axivity AX3 device (logging accelerometer) that was suitable for continuous wear by infant/toddlers aged 3-24 months
- To test the feasibility and acceptibility of this device in a Soweto population



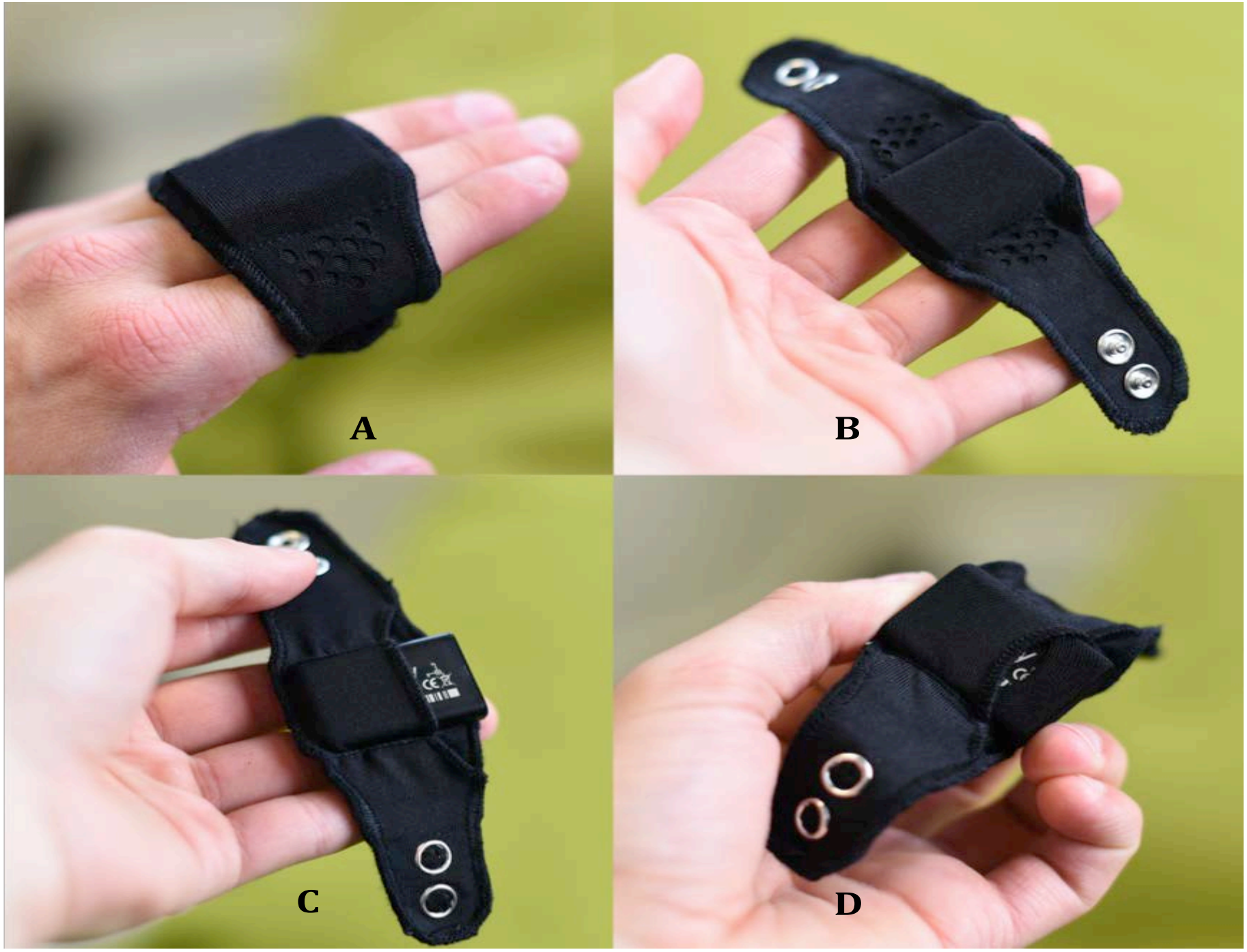


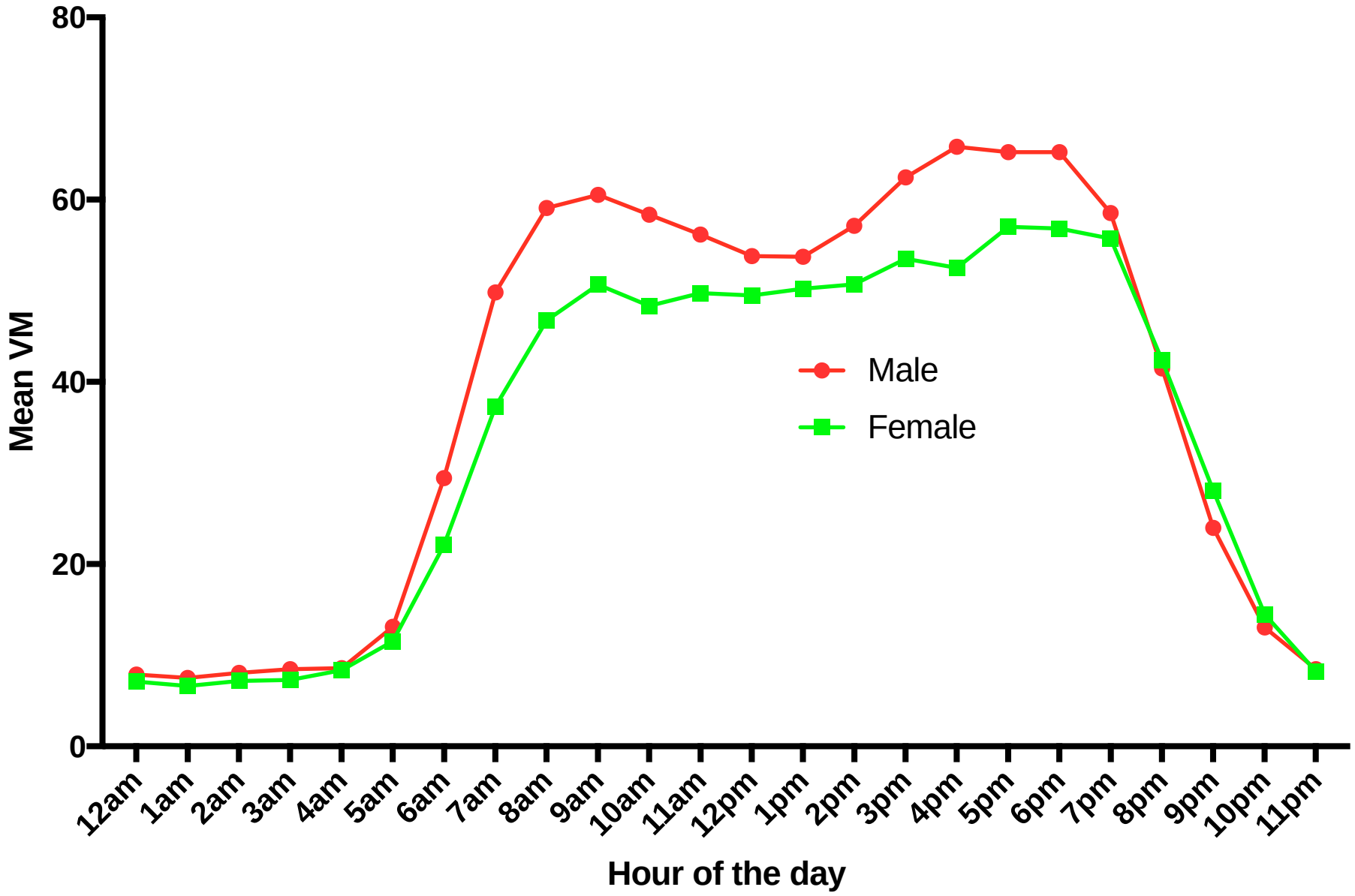
*Horizontal position of AX3 on 18mth old*

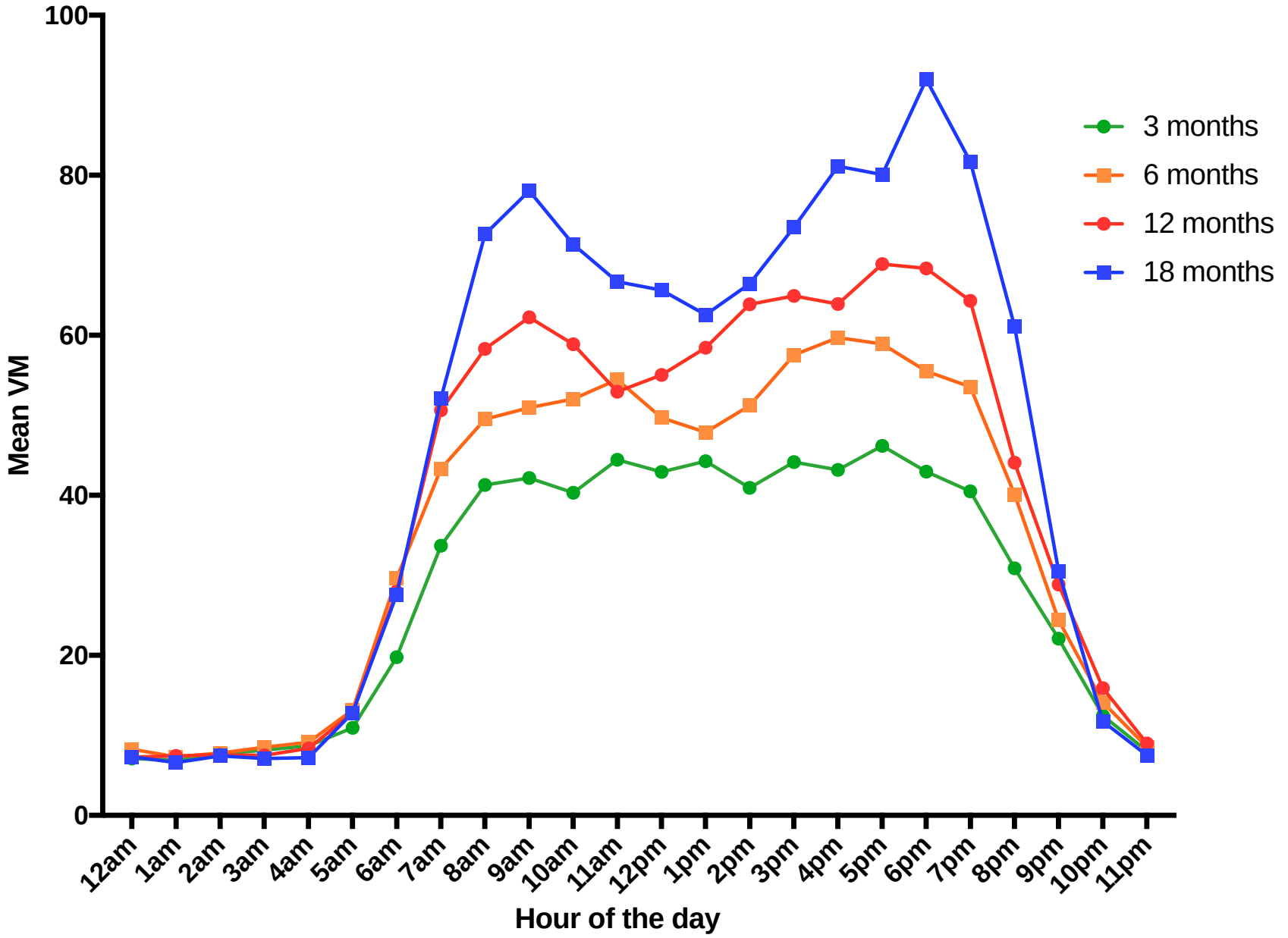
*Vertical position of AX3 on 18mth old*

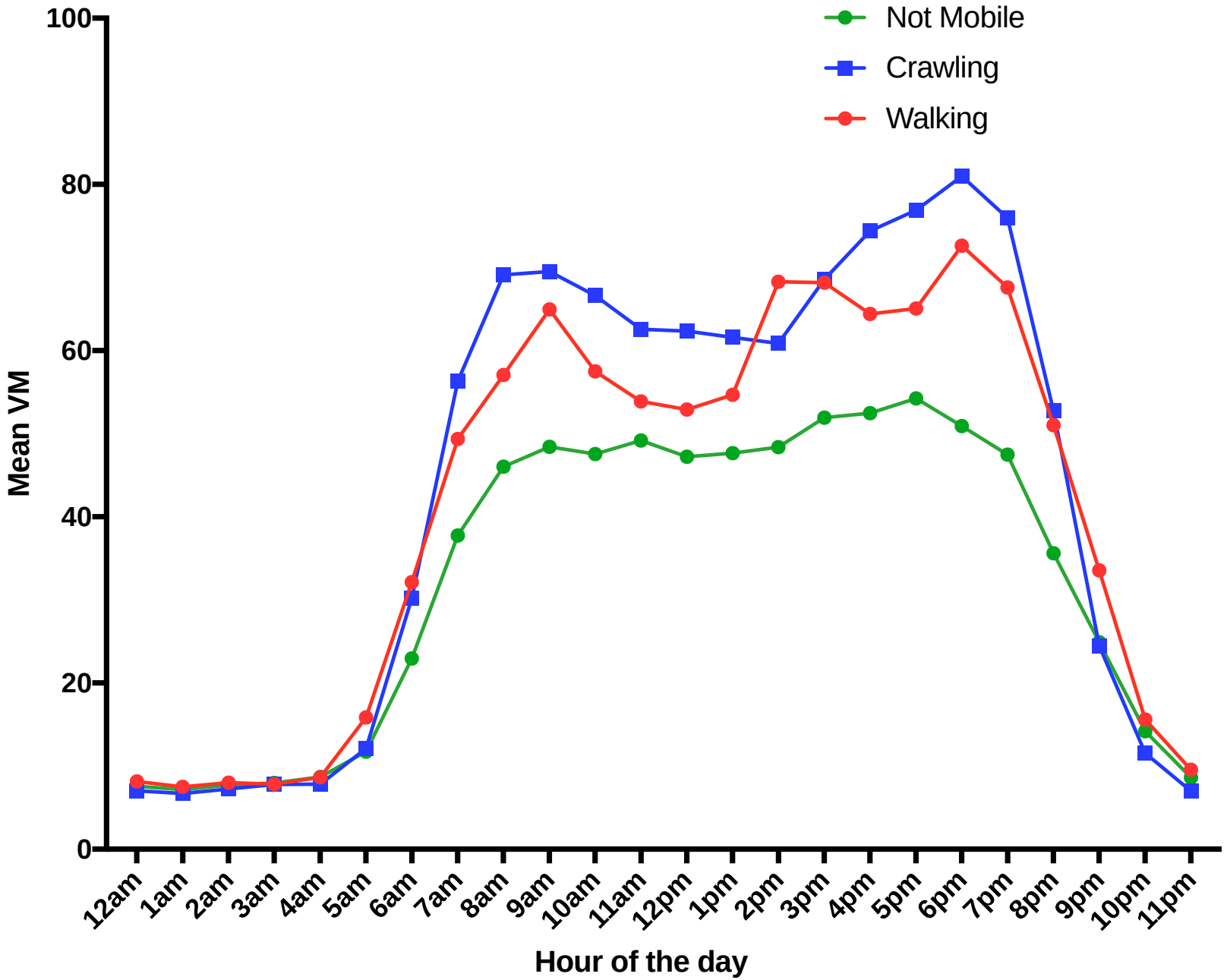
# Piloting and final design

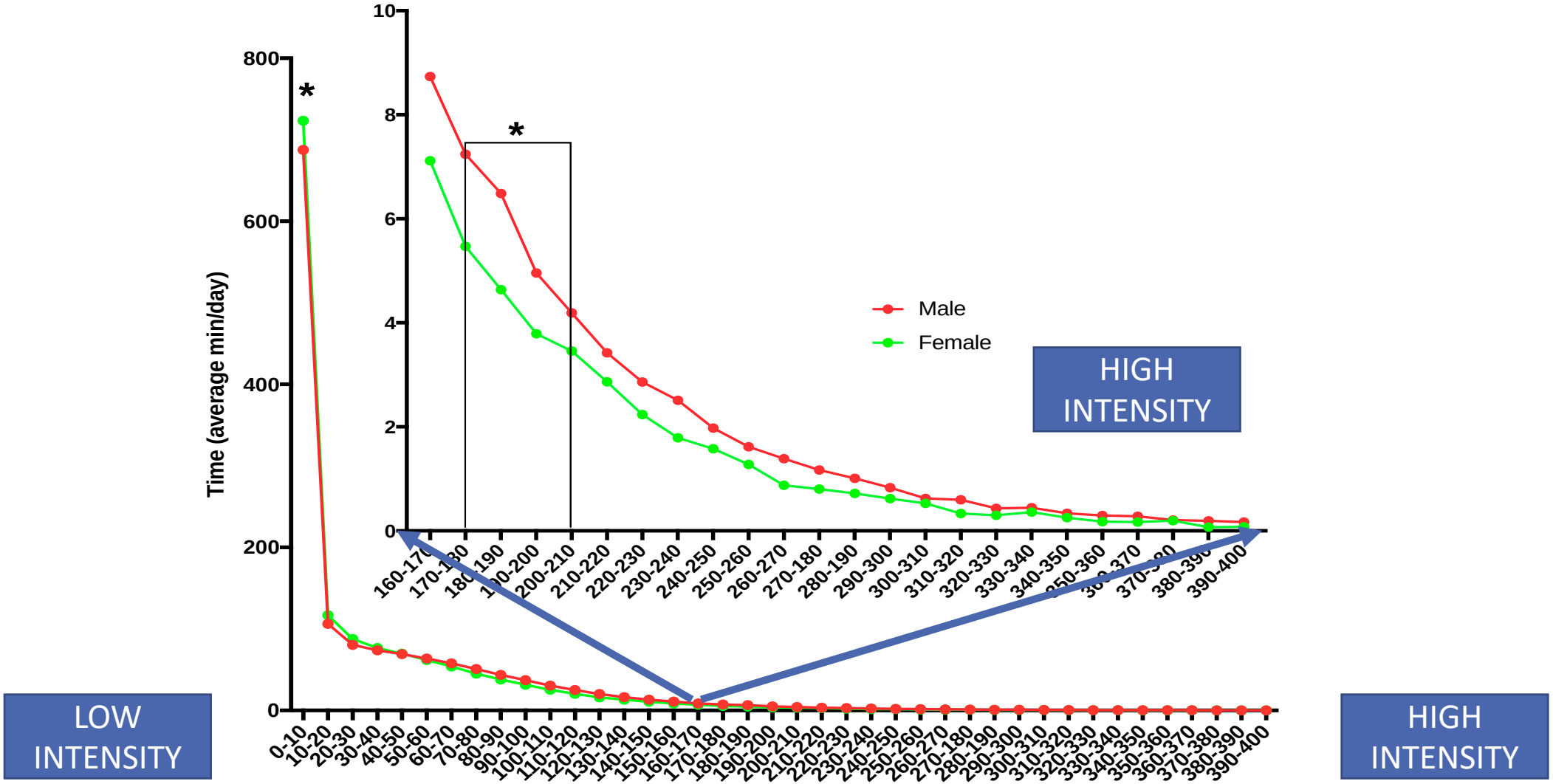
- Piloting on prototype designs in Cambridge, UK (n=3) and Soweto, South Africa (n=6):
  - Security of the bands (parents commented on a range of press stud configuration for fixing bands)
  - Inflexibility of a cotton material used in early designs.
- The final designs (full material and component specifications and design patterns) are published under Creative Commons 3.0 BY Attribution licence (see: https://github.com/digitalinteraction/openmovement/wiki).

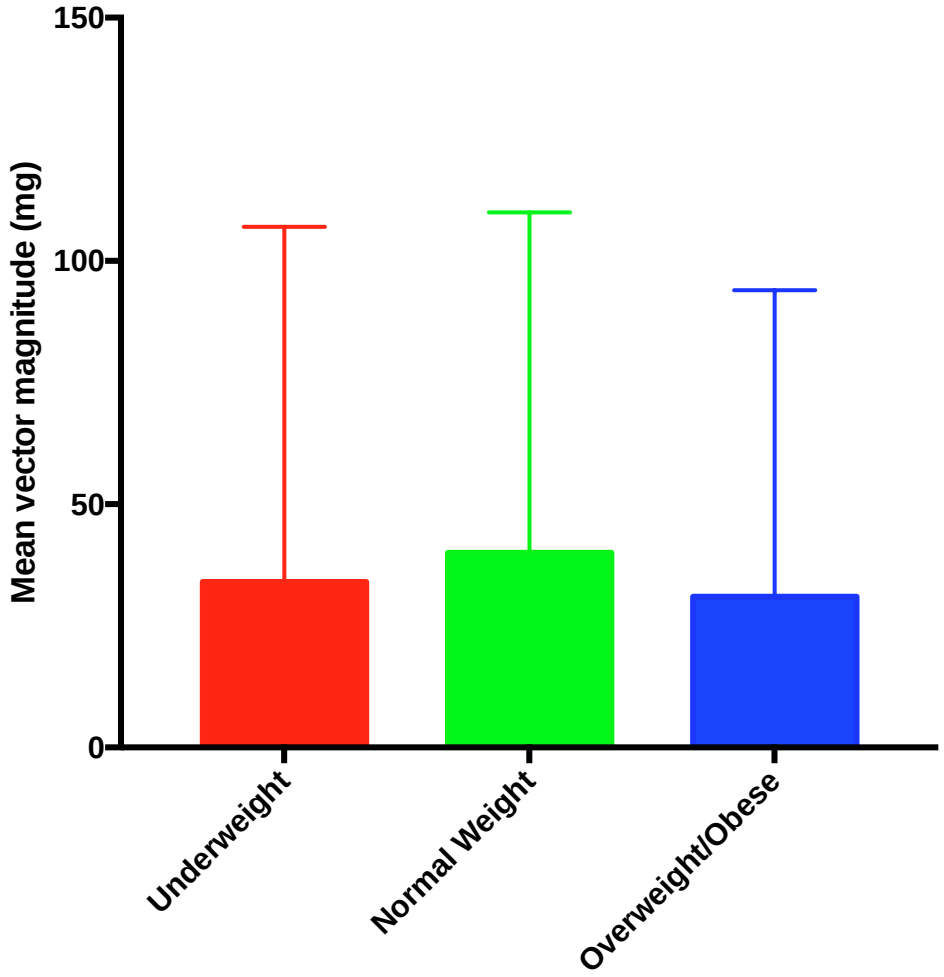

A
B
C
D

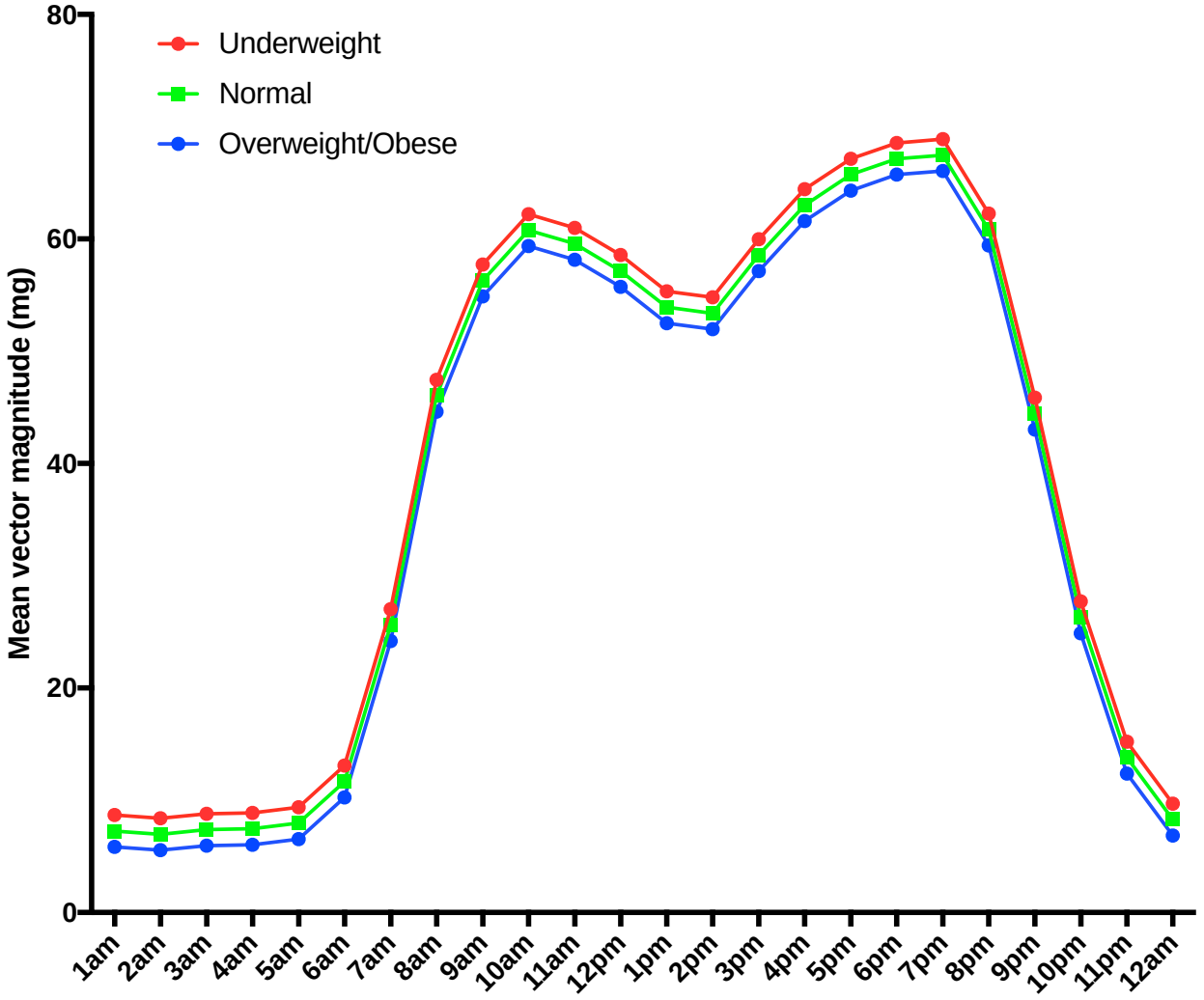

80
60
40
20
0
Mean VM
Male
Female
12am
1am
2am
3am
4am
5am
6am
7am
8am
9am
10am
11am
12pm
1pm
2pm
3pm
4pm
5pm
6pm
7pm
8pm
9pm
10pm
11pm
Hour of the day


100
80
60
40
20
0
Mean VM
12am
1am
2am
3am
4am
5am
6am
7am
8am
9am
10am
11am
12pm
1pm
2pm
3pm
4pm
5pm
6pm
7pm
8pm
9pm
10pm
11pm
Hour of the day
3 months
6 months
12 months
18 months


Not Mobile
Crawling
Walking
Mean VM
100
80
60
40
20
0
12am
1am
2am
3am
4am
5am
6am
7am
8am
9am
10am
11am
12pm
1pm
2pm
3pm
4pm
5pm
6pm
7pm
8pm
9pm
10pm
11pm
Hour of the day


Time (average min/day)
800
600
400
200
0
10
8
6
4
2
0
*
*
Male
Female
HIGH INTENSITY
LOW INTENSITY
HIGH INTENSITY
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100
100-110
110-120
120-130
130-140
140-150
150-160
160-170
170-180
180-190
190-200
200-210
210-220
220-230
230-240
240-250
250-260
260-270
270-180
280-190
290-300
300-310
310-320
320-330
330-340
340-350
350-360
360-370
370-380
380-390
390-400




ANOVA p<0.01

β=-1.42, p=0.57

# Caregiver-Infant interactions

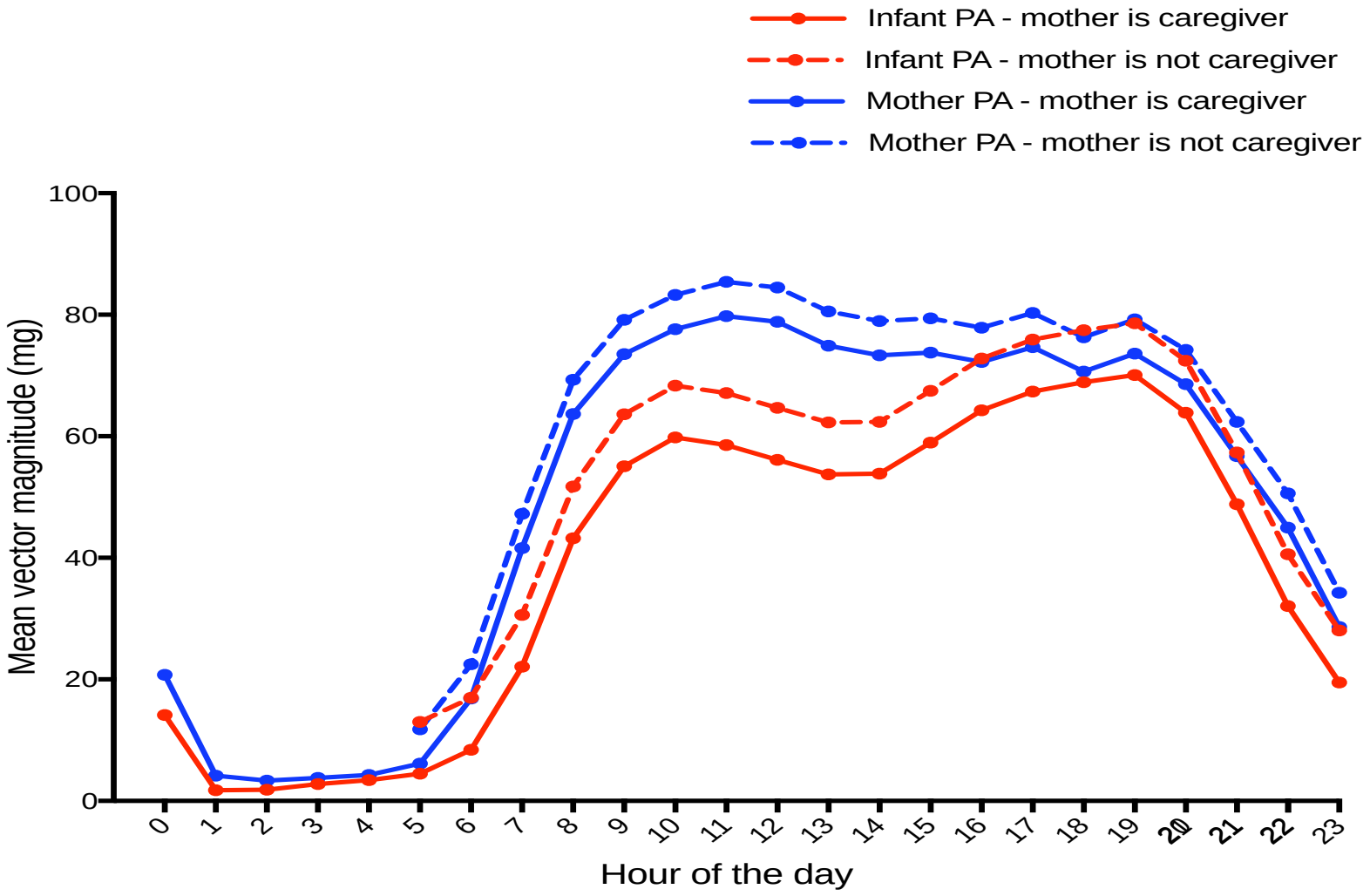
**Movement in the first two years of life is likely dependent on opportunities provided by caregivers**

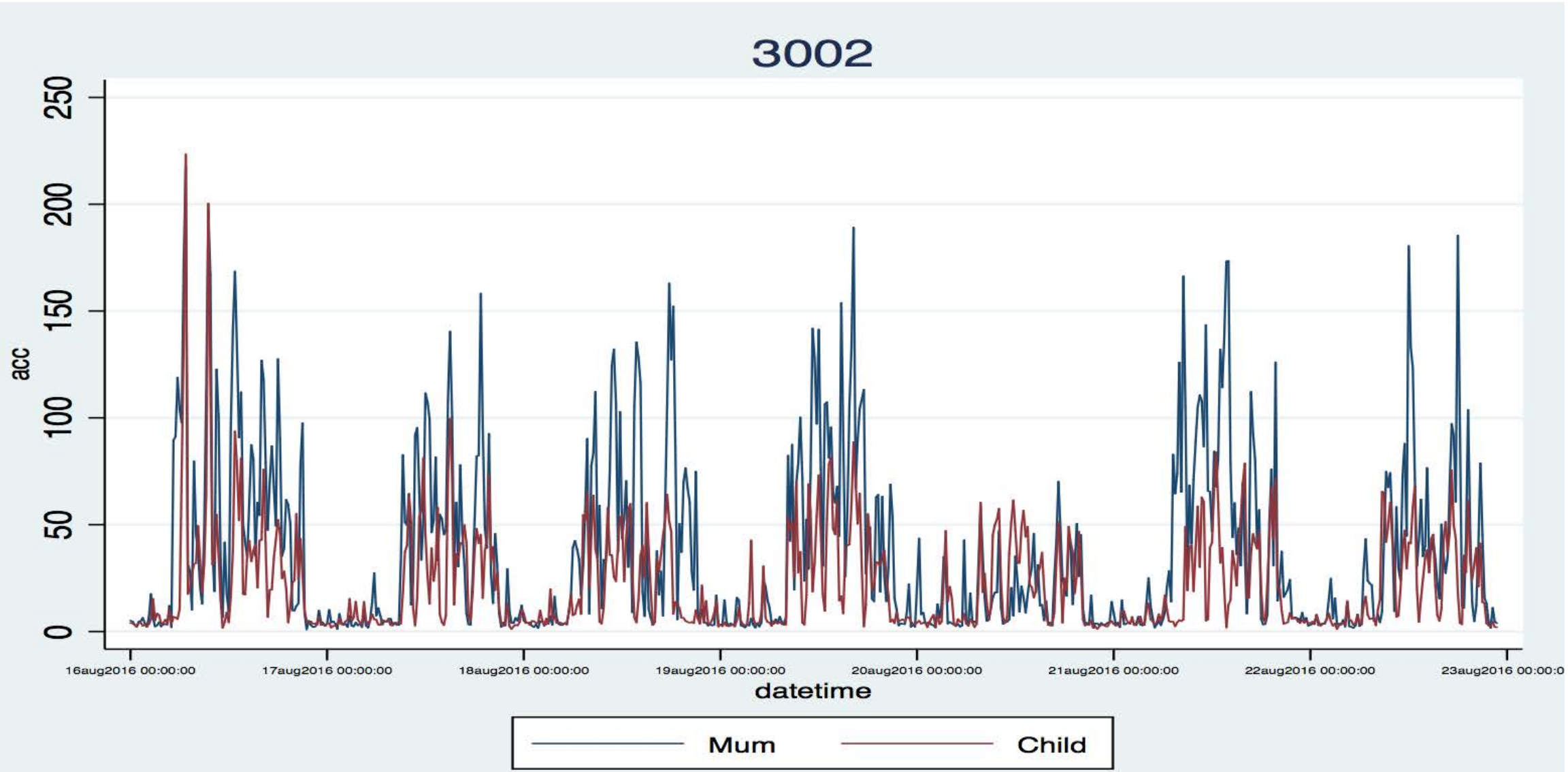
- Thereafter, activity is influenced through
- *Role Modeling*
- *Joint participation*
- *Home environment*
- *Genetics*

**Evidence in the first two years of life is unclear**

- Many confounding variables
- *Other children*
- *Employment*
- *Time of day*

- Mothers physical activity and interaction with infants was shown to influence infant physical activity (0-2 years).
- Infants were more active when they were not with their mother, unless their mother was being active while they were together.




3002
acc
0
50
100
150
200
250
16aug2016 00:00:00
17aug2016 00:00:00
18aug2016 00:00:00
19aug2016 00:00:00
20aug2016 00:00:00
21aug2016 00:00:00
22aug2016 00:00:00
23aug2016 00:00:0
datetime
Mum
Child

# Headcams to measure parent-infant interactions

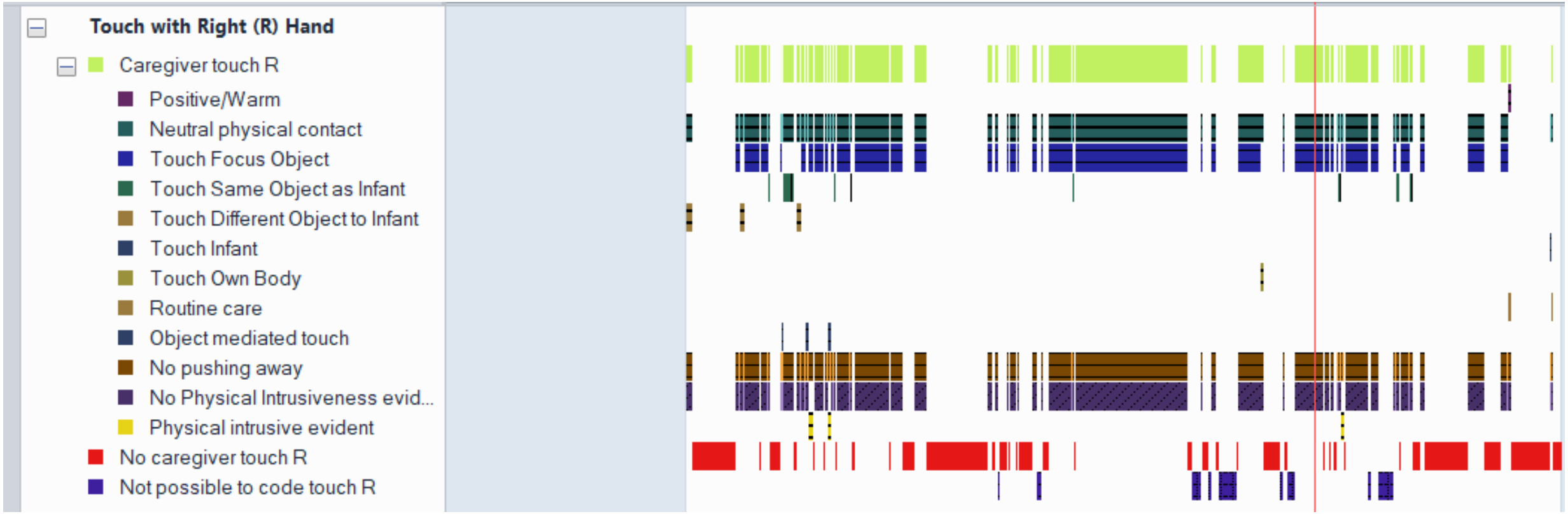
# Pilot findings for headcam use in SA

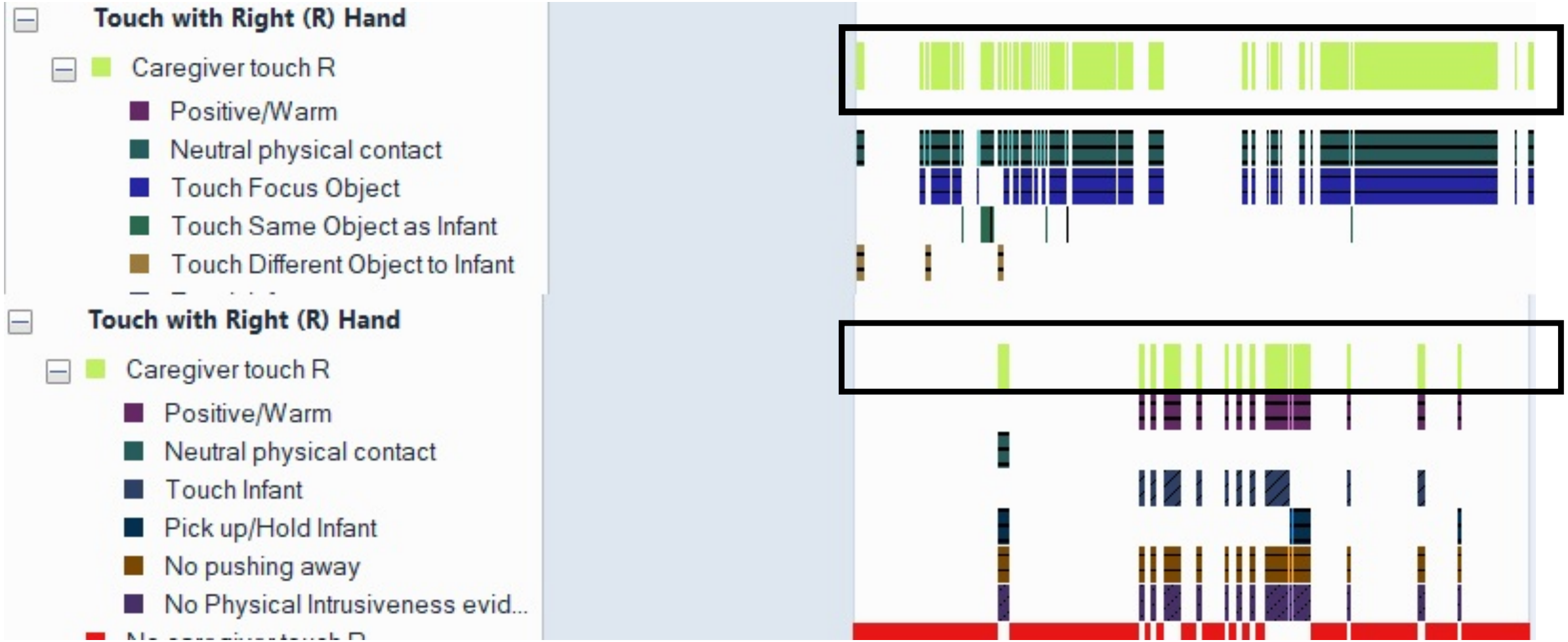
POSITIVES

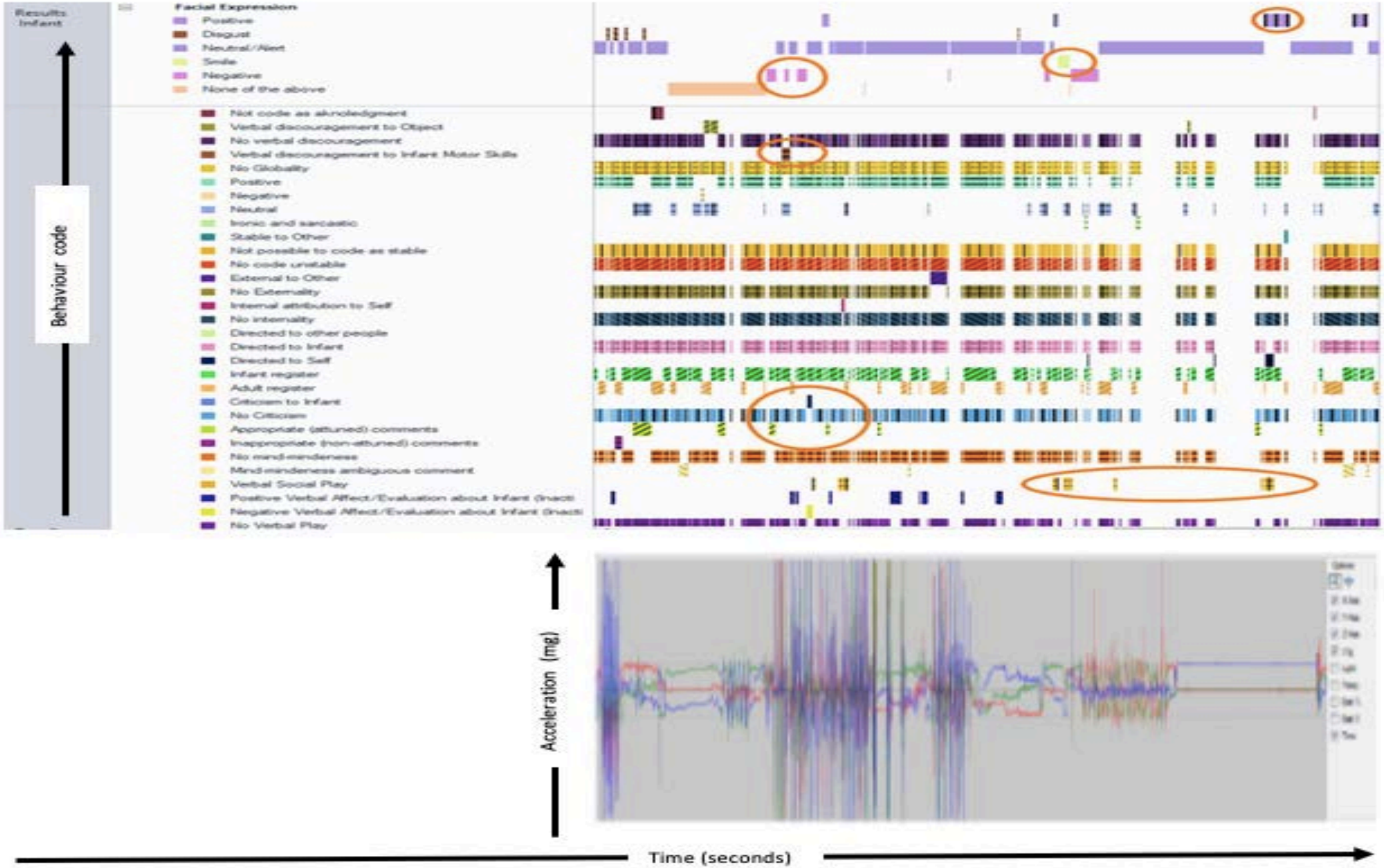
- The majority of mothers reported that they enjoyed using the headcams.
- Instructions given were useful and sufficient
- Other family members did not mind the use of cameras in the home, and in fact enjoyed being involved.
- All mothers reported that they would wear the headcams again, and were interested in viewing the footage obtained; and, in general, were not concerned about breaches in privacy or the use of their data.

NEGATIVES

- The headcams used did not indicate when they were recording, and this made it difficult for some mothers to know whether they switched on correctly.
- Some mothers reported difficulties with using the headband placement of the camera on the infant and suggested different methods of attachment.
- Acceptability, as well as feasibility of the data was better in younger infants due to decreased autonomy of movement and better compliance.


Touch with Right (R) Hand
Caregiver touch R
Positive/Warm
Neutral physical contact
Touch Focus Object
Touch Same Object as Infant
Touch Different Object to Infant
Touch Infant
Touch Own Body
Routine care
Object mediated touch
No pushing away
No Physical Intrusiveness evid...
Physical intrusive evident
No caregiver touch R
Not possible to code touch R


Touch with Right (R) Hand
Caregiver touch R
Positive/Warm
Neutral physical contact
Touch Focus Object
Touch Same Object as Infant
Touch Different Object to Infant
Touch with Right (R) Hand
Caregiver touch R
Positive/Warm
Neutral physical contact
Touch Infant
Pick up/Hold Infant
No pushing away
No Physical Intrusiveness evid...


Results: Infant
Behaviour code
Facial Expression
Positive
Disgust
Neutral/Alert
Smile
Negative
None of the above
Not code as aknowledgment
Verbal discouragement to Object
No verbal discouragement
Verbal discouragement to Infant Motor Skills
No Globality
Positive
Negative
Neutral
Ironic and sarcastic
Stable to Other
Not possible to code as stable
No code unstable
External to Other
No Externality
Internal attribution to Self
No Internality
Directed to other people
Directed to Infant
Directed to Self
Infant register
Adult register
Criticism to Infant
No Criticism
Appropriate (attuned) comments
Inappropriate (non-attuned) comments
No mind-mindedness
Mind-mindedness ambiguous comment
Verbal Social Play
Positive Verbal Affect/Evaluation about Infant (Inacti
Negative Verbal Affect/Evaluation about Infant (Inacti
No Verbal Play
Acceleration (mg)
Time (seconds)

# Thank you

- DST-NRF Centre of Excellence in Human Development
- Claude Leon Foundation
- Newton Fellowship

Contact

Alessandra.prioreschi@wits.ac.za
A_Prioreschi