

A man with a surprised expression is wearing a VR headset. His eyes are wide open, and his mouth is slightly agape. He is wearing glasses. The background is dark, and the scene is lit with a reddish-pink hue. Hands are visible adjusting the VR headset on his head.

# Seeing is Believing

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Route

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**ROUTE**

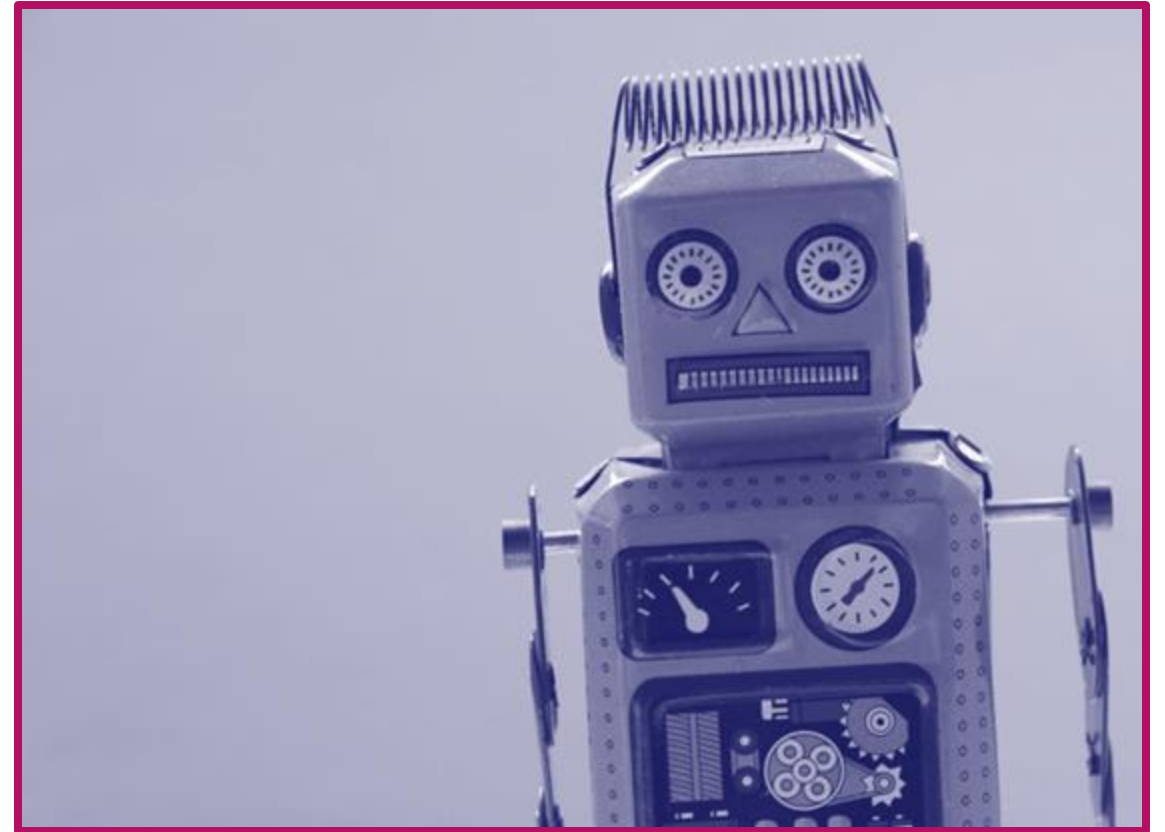


**Impressions  $\neq$  Impacts**

**ROUTE**

Impression: Measurement of responses from a web server filtered from robotic activity and error codes, recorded at a point as close as possible to opportunity to see the page by the user.

Viewable impression: >50% of pixels on an in-focus browser tab on the viewable space of the browser page for greater than or equal to one second, post ad render (for video ads it's 2 seconds)



# Digital impressions are equivalent to a count of OOH spots / ads broadcast.

Not only is this not a measure of audience, but it does not work in a one to one medium. OOH is one to many, meaning multiple people see each ad broadcast. Server clicks under sell true audiences.



LOOK  
AT ME.

WE CAN STOP IT.



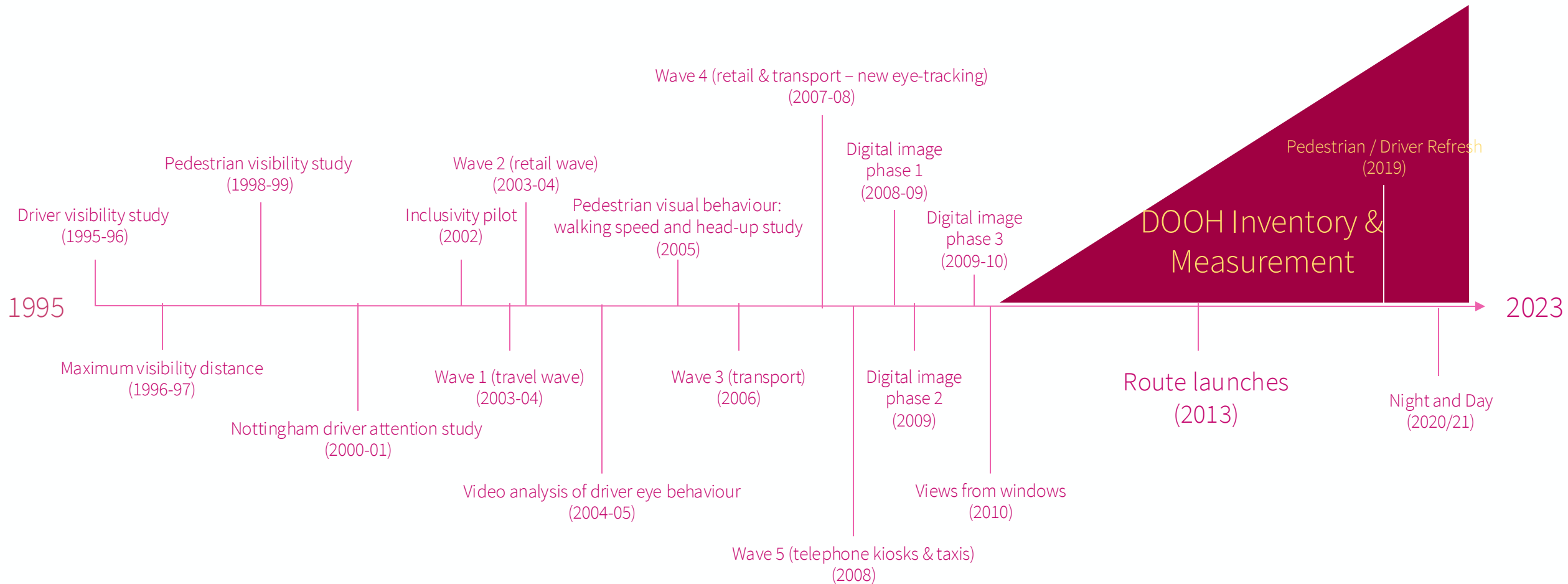
We measure **people who**  
**actually see ads**

**ROUTE**

A man with glasses and a suit is speaking. The image has a dark red overlay. Text is overlaid on the bottom right.

**We do this using visual attention  
(eyetracking) work**

# Route's legacy in visual attention pre-dates Route



Route continues to build knowledge and expertise in this space and are currently in field with new work now



# Application 1: calculate the areas from where ads can be seen

- In 1997 Route (nee Postar) undertook research to determine the maximum distance from which it is possible to see a poster or screen.
- This used psychophysical methods.
- The outcome is an equation calculating the distance from which any site can be seen on the basis of its surface area.
- This calculation is applied to all frames that Route measures and governs the areas and links from where it's possible to see the ad.



## Application 2: determine how likely those within visibility areas are to see an ad



In addition to calculating the areas from where people are exposed to OOH, we use eye tracking to determine how likely people passing through the visibility areas are to see the ads.

# What do we know about how people view OOH ads?

Lots! Route has conducted a wealth of visual attention studies to build up our understanding of how likely people are to notice OOH ads.



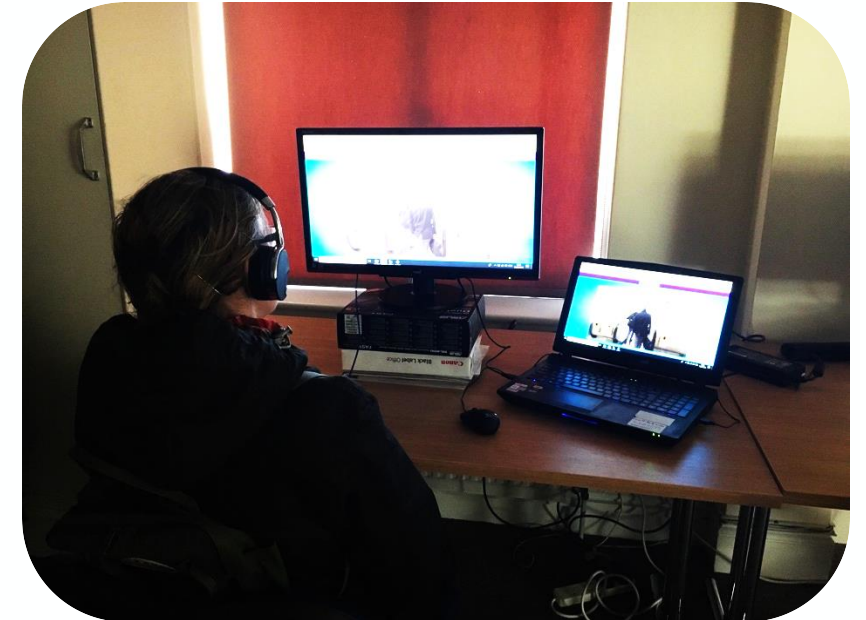
# How do visual attention studies work?

Then



Skalar IRIS eye tracking system + IBM compatible 486 PC situated in a dimly lit room illuminated by a single 60W lamp positioned above + Viglen 14 inch IBM PC VGA colour monitor operating with at a resolution of 640 by 480

Now



Tobii X2-30 eye tracking devices + 24" inch screens, in 16:9 aspect ratio, with refresh rates of 75Hz and screen resolution of 1920x1080

# Calculating how likely people are to see an ad when they have the chance to

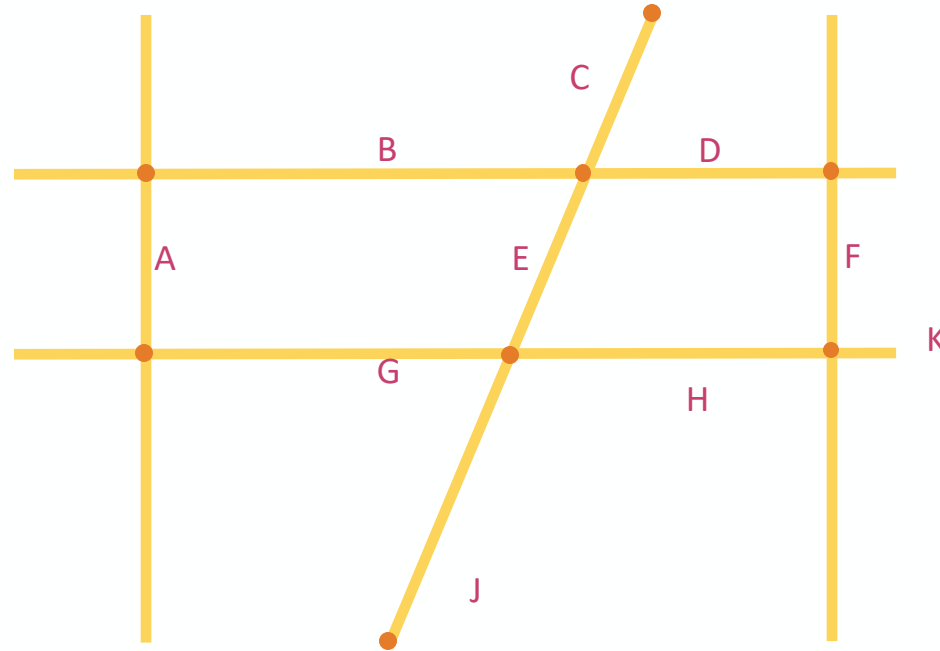




**How does it work in practice?**

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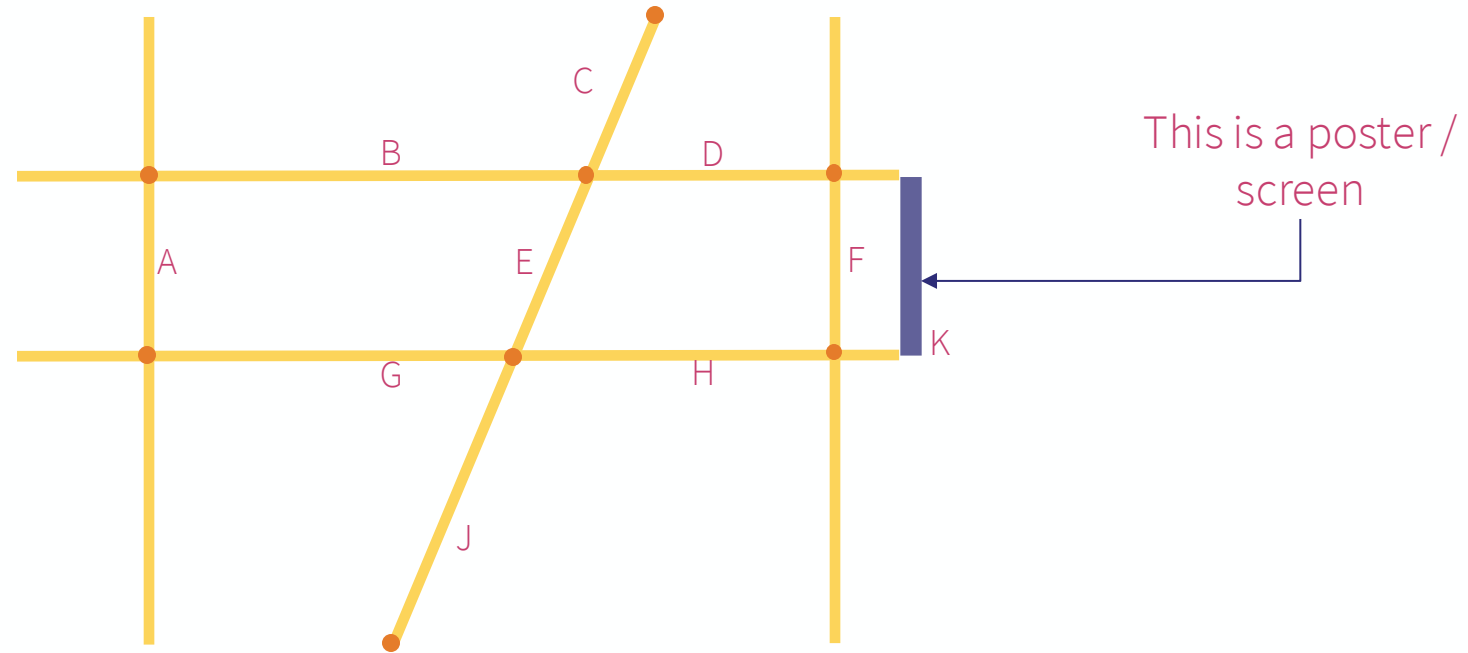
# We start with a map



We start with a map (the lines in yellow). This may be either indoors or outdoors. Each of the lines above represent different 'links' (roads or pathway segments of up to 20 metres in length).

In this instance the letters denote 10 people.

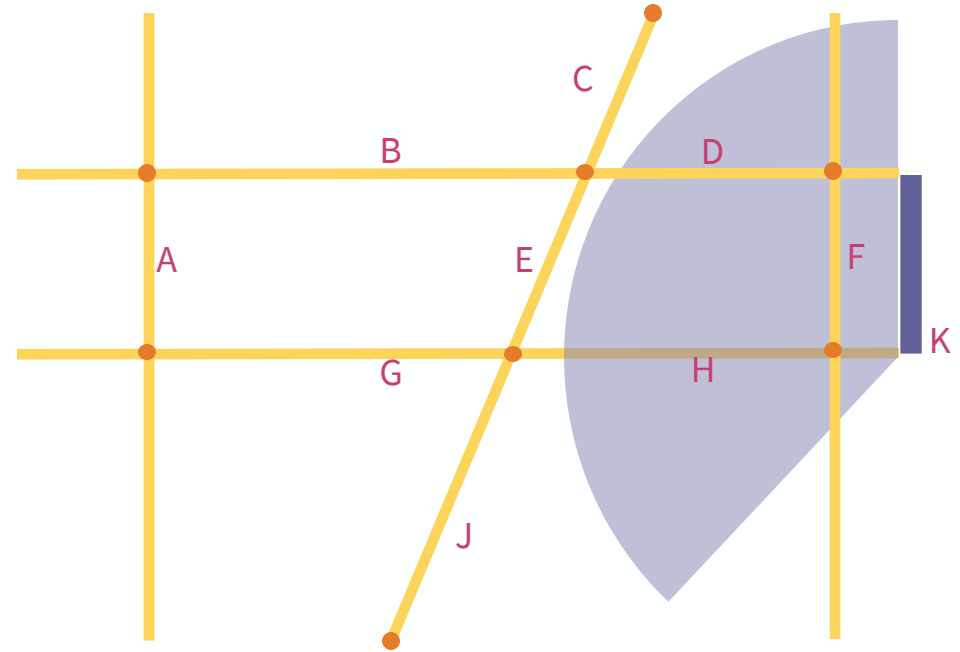
# We then add the inventory



We then locate the posters / screens on the map. All 10 people here have an opportunity to see the OOH ad as they are in proximity to the ads.

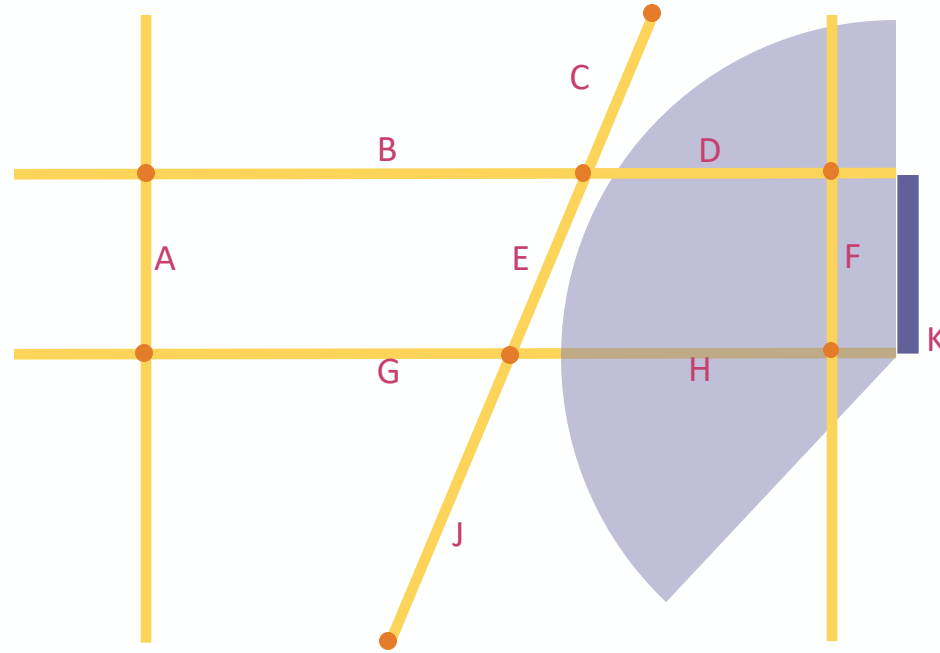
# We determine areas (and links) from where ads are visible

Eye-tracking research enables Route to calculate the maximum visibility distance from which OOH ads can be seen. These are used to create 'visibility areas' (highlighted in blue) which are appended to our maps. Anyone travelling on links within these areas, have a realistic opportunity to see the ad.



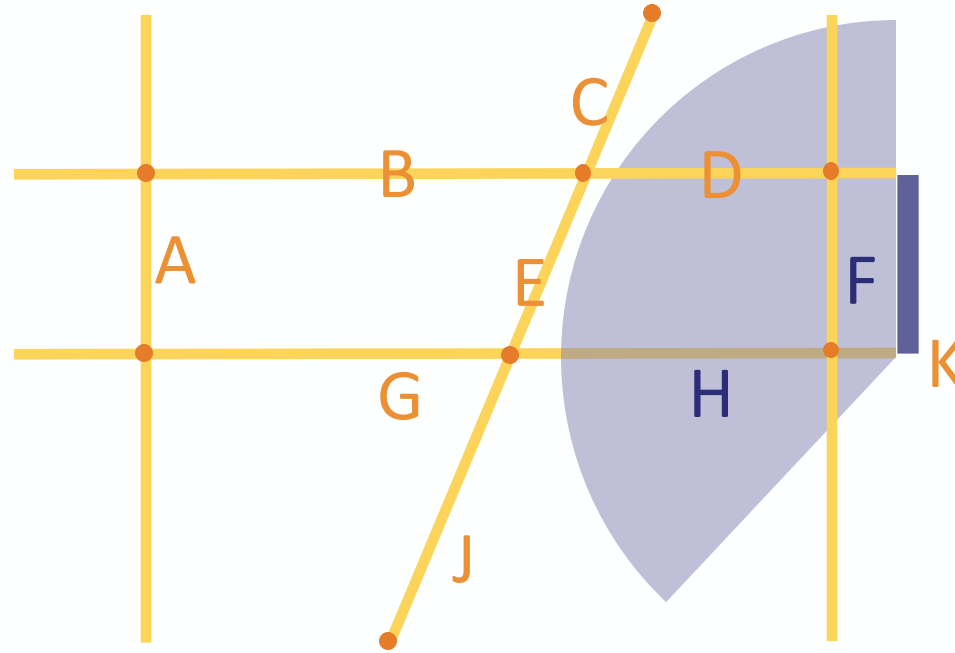
Three people in the example above fall into this category. Worth noting that person K, though closest to the ad, can't see it, as they are hiding behind it. However, we don't stop there...

# But we don't stop at this point...



We can't just accept that because people can see the ad, that they have actually looked at it. We need a measure of those who have seen ads, not just been exposed to them. The next step therefore is to assign a probability that those who are within the visibility areas will actually see the ads.

## Step 4: Determine likelihood of seeing ads



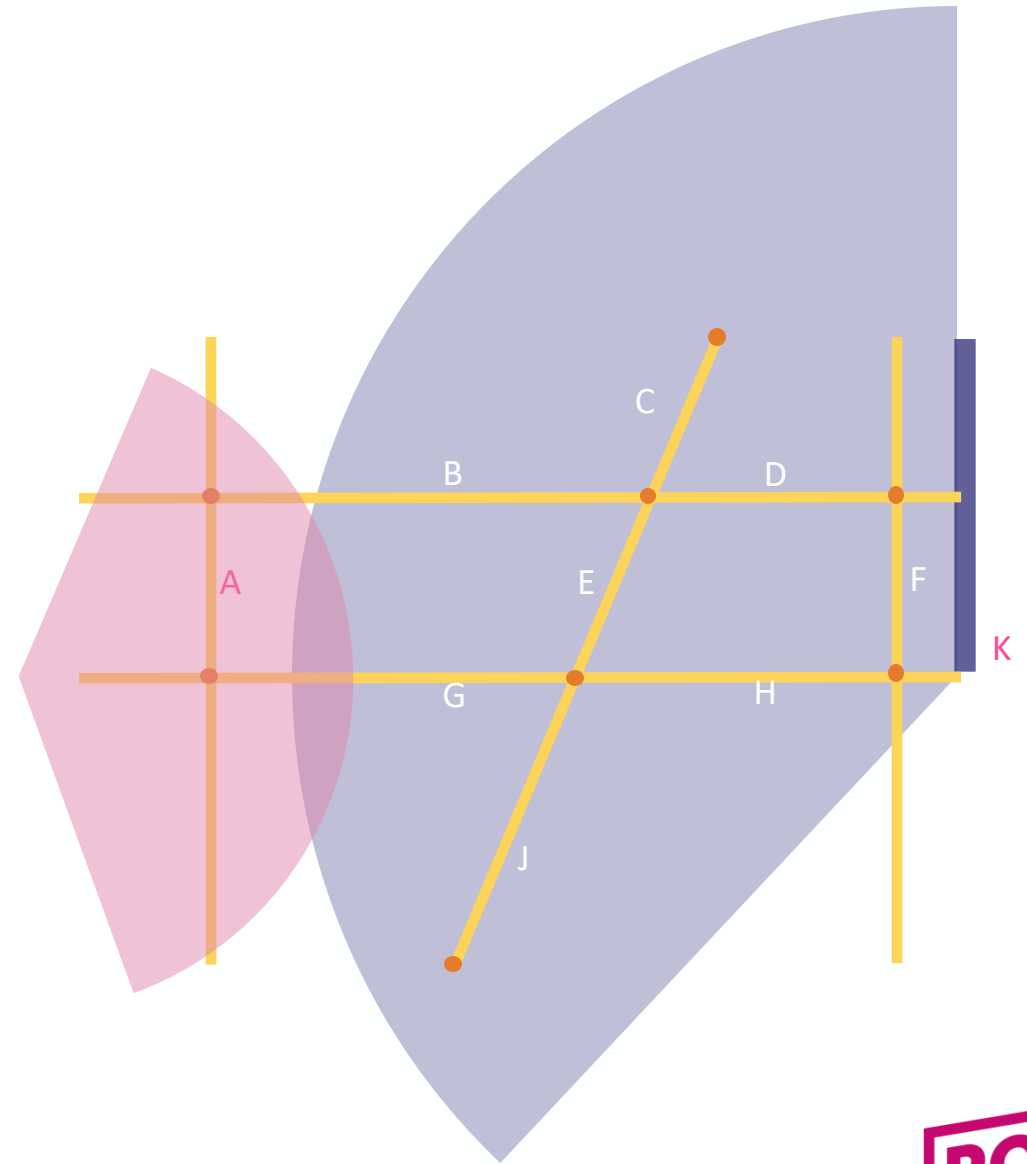
But we don't just accept that because people can see the ad, that they have actually looked at it. We need a measure of those who have seen ads, not just been exposed to them. The next step therefore is to assign a probability that those who are within the visibility areas will actually see the ads. We use data from eye tracking to help quantify this.

**What affects the likelihood of someone actually seeing an ad?**



# 1. Size of frame

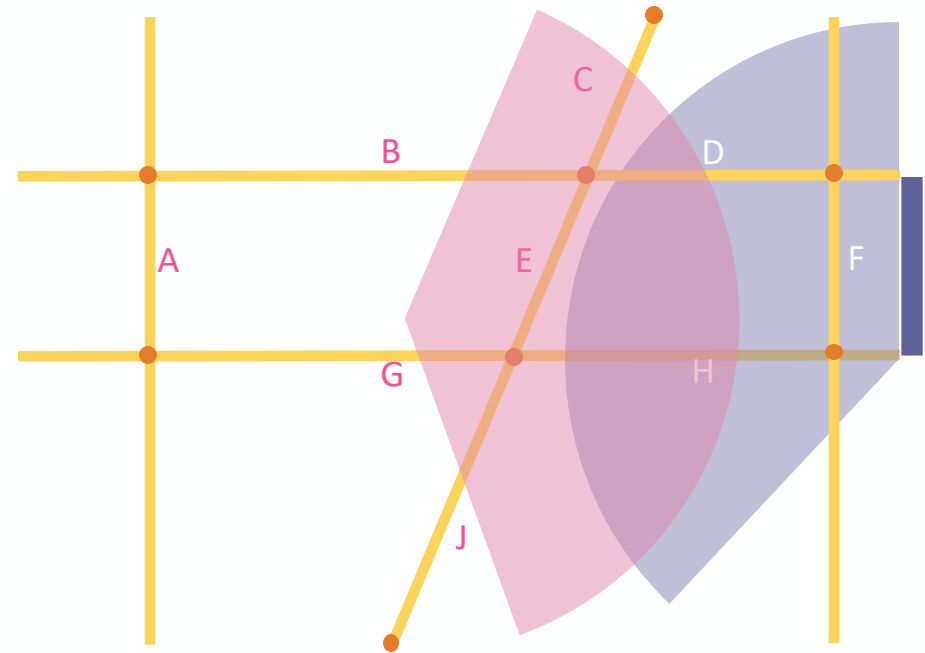
The larger the frame, the larger the visibility area. This in turn means that there is a greater chance that people will be in the visibility areas and spend more time in them. In turn, eye-tracking research has shown that people notice larger objects more quickly than small. Therefore, larger ads have a greater likelihood to be seen.



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## 2. Distance from audience

Broadly speaking, the closer a person is to the frame, the greater the probability that it will be seen. That is, until people are really rather close to it, at which point they focus further away and the probability subsequently drops.



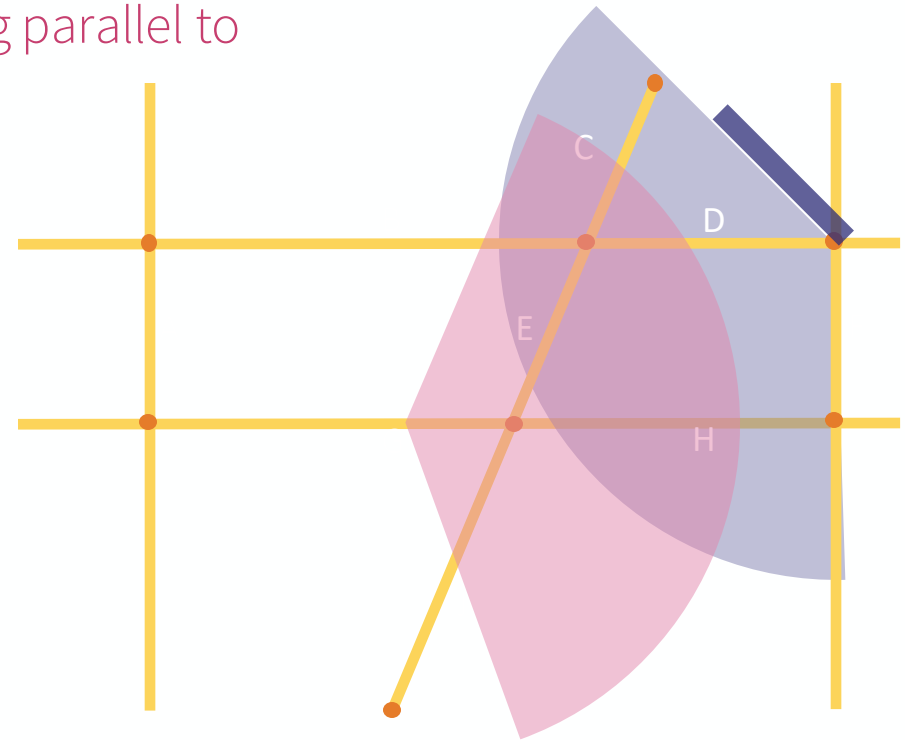
### 3. Offset

People are more likely to notice something that is directly in front of them, rather than something that is offset to the side. The extent to which the frame is set back from the participant affects the likelihood of it being seen.



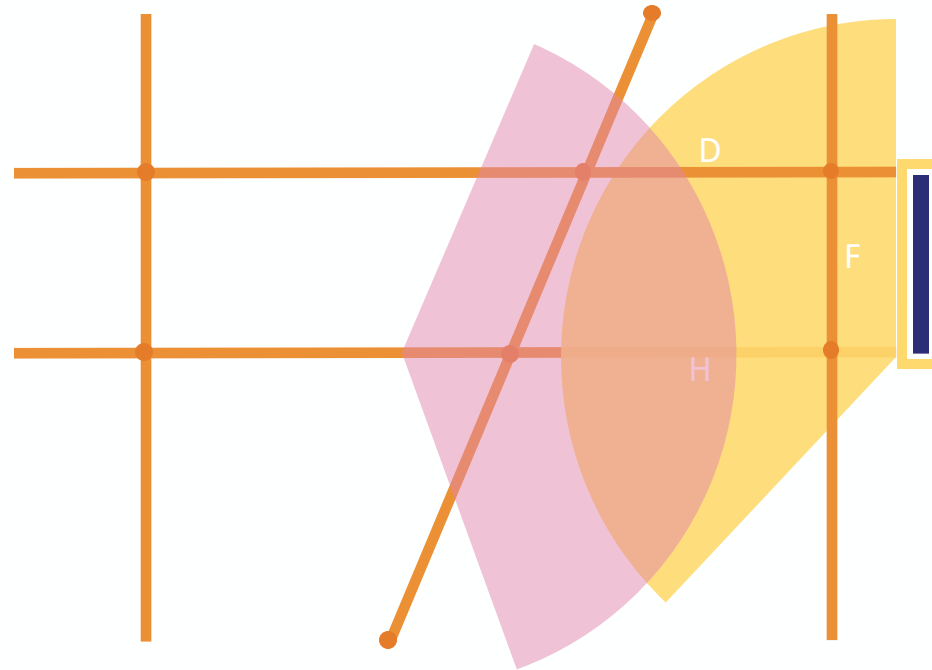
## 4. Distortion

The distortion, or angle at which the poster sits relative to the person will also affect the likelihood of it being seen. The more angled the ad is to the flow of travel, the less likely it is to be seen. Face on ads are most likely to be seen with ads running parallel to the flow of traffic least likely.



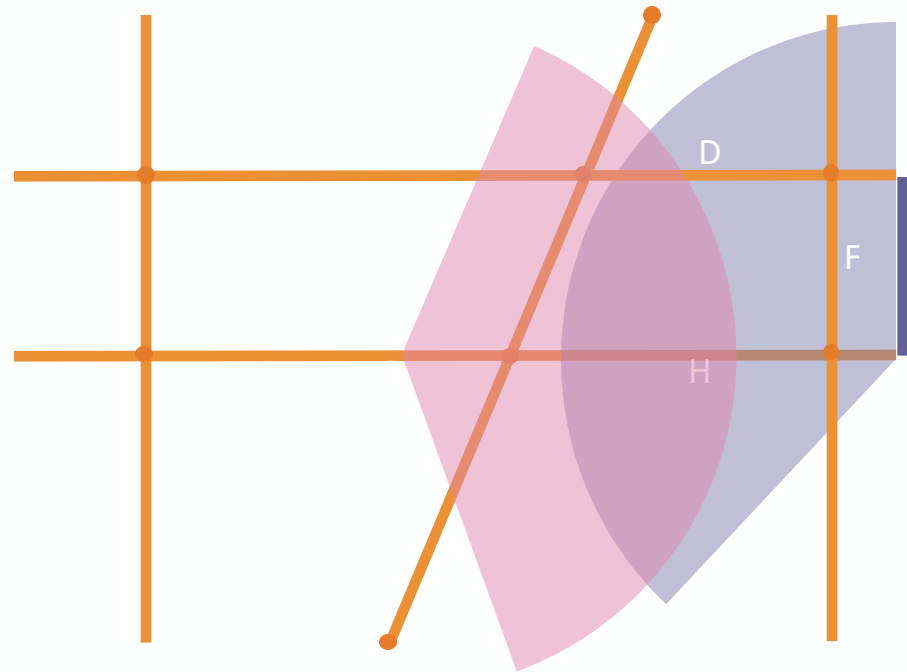
# 5. Illumination

Research demonstrates that ads which are illuminated are more easily seen than those which are not. This is particularly important during hours of darkness.



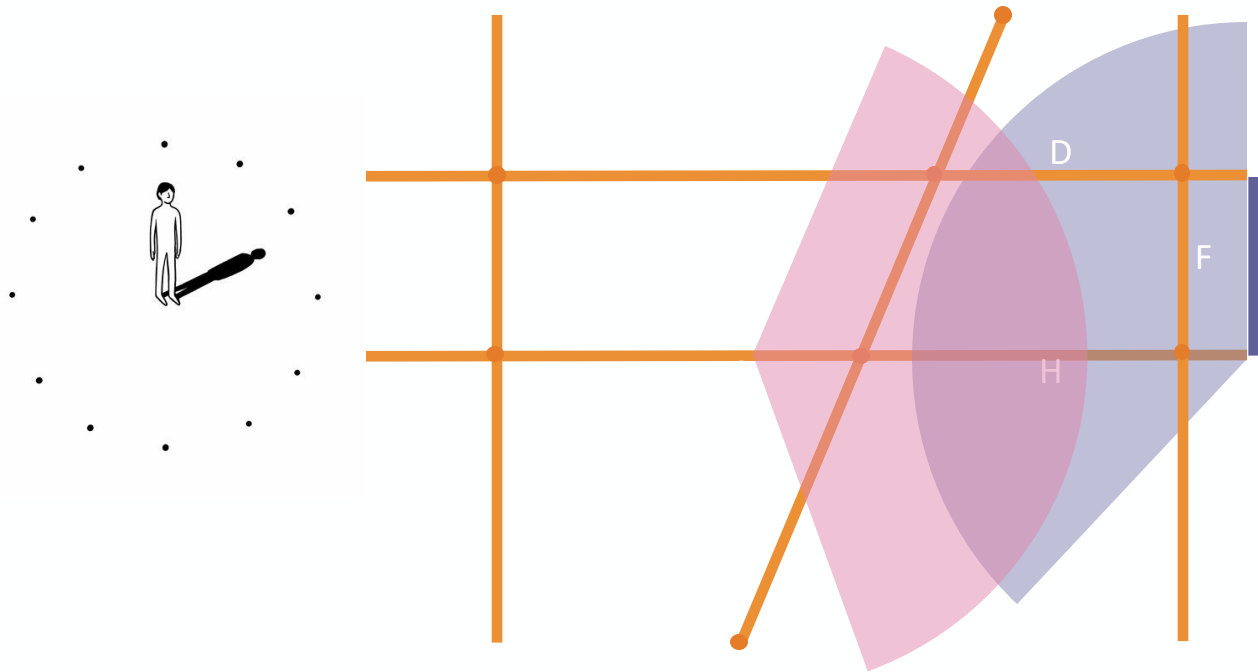
## 6. Does the poster / screen include movement?

Does the ad contain movement? Dynamic advertising is more eye-catching than flat, static imagery. Therefore, ads which move receive a boost in terms of their likelihood to be seen.



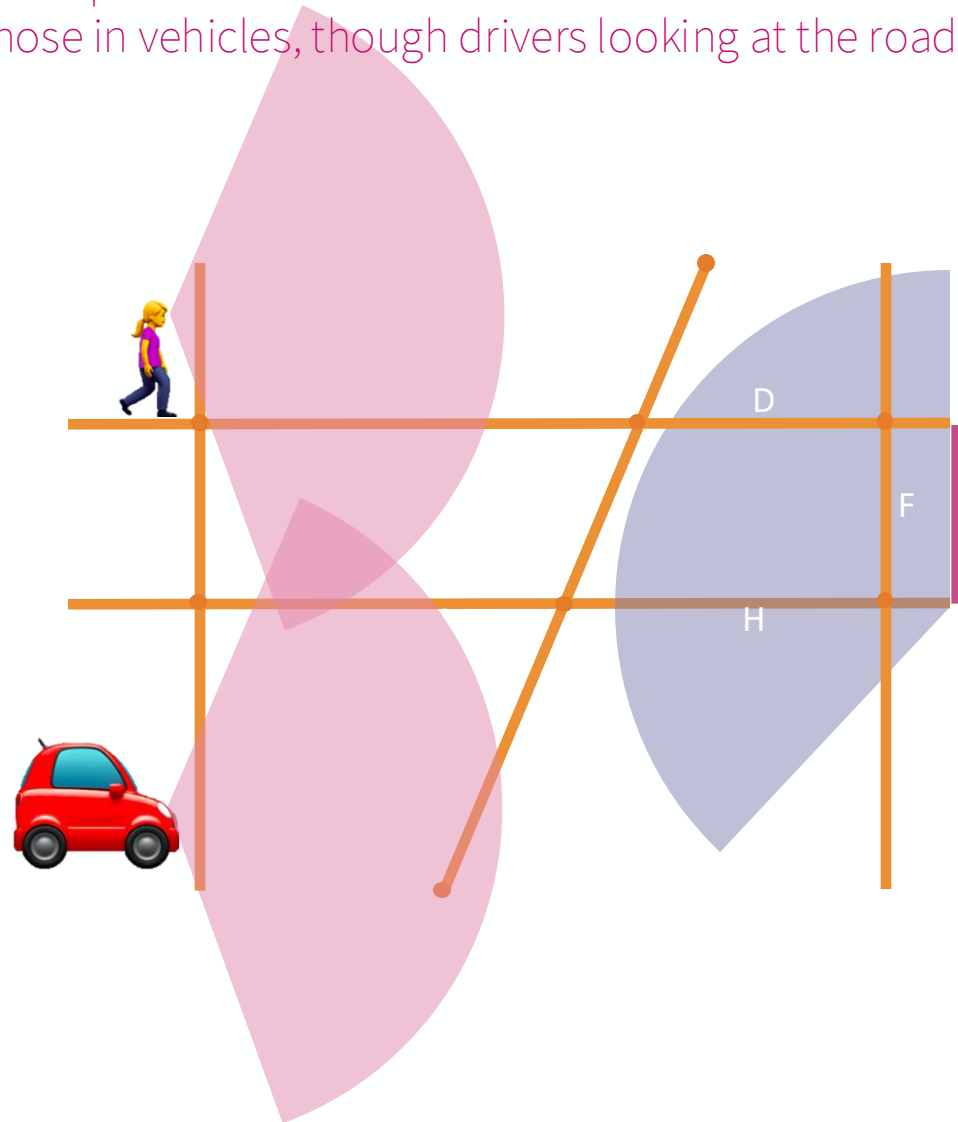
## 7. How long are people exposed for?

The duration of time people spend exposed to the ads increases the probability with which they will notice them. The probability of seeing the ad is recalculated and aggregated for every exposure to a frame at 0.1 second increments.



## 8. How are people exposed?

The mode of transport during the exposure has an effect on the likelihood of the ad being seen. Generally, pedestrians are more likely to notice ads than those in vehicles, though drivers looking at the road are more prone to noticing buses and taxis



# We now account for people moving at variable speed...

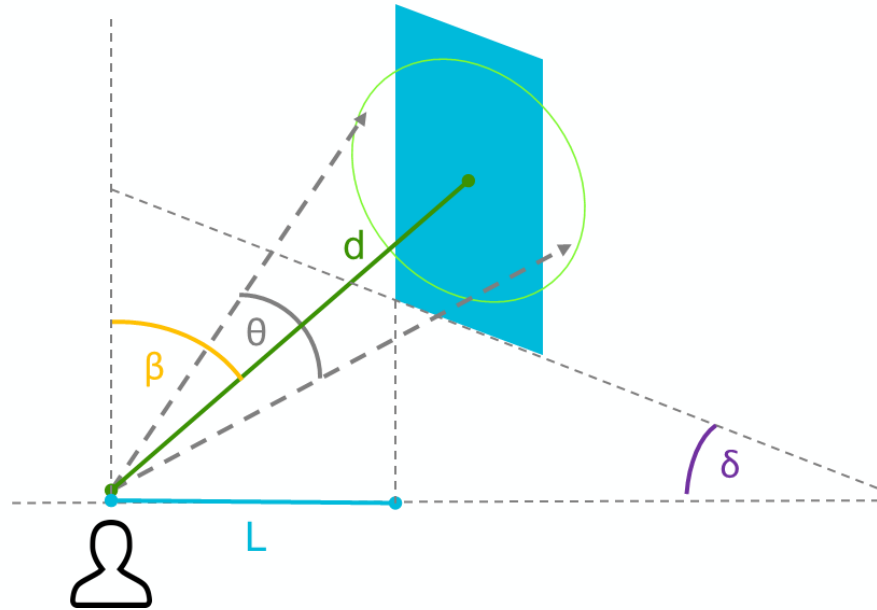
This is of particular note for digital screens as people can be exposed to more ads



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# The science of visual attention

The geometry of visibility research



$\theta$  = visible angle (degrees) [Theta]

$d$  = distance (m)

$\delta$  = deflection angle (degrees) [Delta]

$\beta$  = bearing (degrees) [Beta]

$L$  = offset (m)

The notational equation of visibility research

Visibility equation:

$$p = 1 - e^{-k\theta}$$

Where  $p$  is momentary hit rate (% view in 0.1")

In this notation, theta (visible angle) is a function of Beta (bearing or angle of approach), Delta (distortion angle of the ad to the person). In this case the bearing (Beta) is itself dependent upon the offset distance between the path taken and the ad itself)

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# The process in short

- Establish the visibility areas and identify all the links
- For each person travelling through each visibility area...
  - Identify the mode of transport
  - Identify the speed of travel (for pedestrians)
  - Identify the type of ad (fixed in the ground or mobile, size of ad, whether it features dynamic content or not)
  - Establish their location for each 0.1 second and record:
    - Distance from the ad
    - The offset distance of the ad from the line of travel
    - The distortion angle of the ad to the person
  - Combine these using the route algorithm to establish a momentary hit rate
  - Aggregate these momentary hit rates for the full duration of the exposure
  - Apply dynamic as required
  - Apply illumination factor as required
  - Establish the hit rates for all "contacts" with the frame to create an overall frame level visibility adjustment
  - Apply visibility adjustment against total volume of traffic on links in visibility areas to create impacts

# How the Route Visibility Adjustment process works

The basic principle is that we want to work out for each person entering into an area from where it is possible to see OOH ads (visibility areas), how likely they are to have seen it.

The various research studies which Postar and Route have done, alongside Paul Barber at Birkbeck College, TNS (now Kantar) and more recently Lumen have all featured eye tracking work in different situations, with different stimulus materials and all of which set out to quantify the hit rates on posters or digital screens across different exposure types.

Through the work and previous academic literary reviews a number of factors have been identified which affect the likelihood of seeing something...

- The size of the object – people notice big things before they see small things as they take up a larger portion of the field of vision
- The distance from the object (the closer you are to the object, the greater the likelihood of seeing it)
- The offset distance (the more offset it is from a person's line of travel the less likely it is to be noticed)
- The distortion angle of the object from the line of sight (the closer to 0 degrees [face on] the better)

Each of these together generate the momentary hit rate or “b” in the equation which Ipsos mention above (the exponent).

The momentary hit rate is calculated for every 0.1 seconds that people spend within a visibility area and then aggregated. In other words, every 100 milliseconds that people are exposed to an ad, we calculate the size, distance they are from it, the distance it is offset from their line of travel and the distortion angle between the ad and them and combine it to create a likelihood of seeing at that time. This is then aggregated for the full exposure time (T in the calculation above). The principle being that the longer you spend in the visibility area, the higher the likelihood of seeing the ad. This is referenced as the VAC (visibility adjusted contacts)

Each person's VAC is then aggregated at a frame level to give an overall likelihood of seeing that frame for all the people in cars or on foot who are exposed to the ad.

The k factor is the constant which controls the steepness at which the visibility curve builds. Separate k rates are applied to behaviours and frame types as these have been found in our research have different visibility builds (they are differentiators in the likelihood of getting seen). Currently Route has different k values for pedestrians and vehicular audiences, and for those being exposed to ads fixed in the ground or ads on buses and taxis. In total we have curves built around the following dynamics:

- Pedestrians “walking” (*over 1.85 miles per hour*) and exposed to posters ‘fixed’ in the ground
- Pedestrians “wending” (*between 0.2 – 1.85 miles per hour*) and exposed to posters ‘fixed’ in the ground
- Pedestrians “waiting” (*under 0.2 miles per hour for at least 2 consecutive seconds*) and exposed to posters ‘fixed’ in the ground
- Pedestrians “walking” (*over 1.85 miles per hour*) and exposed to moving ads on buses and taxis
- Pedestrians “wending” (*between 0.2 – 1.85 miles per hour*) and exposed to moving ads on buses and taxis
- Pedestrians “waiting” (*under 0.2 miles per hour for at least 2 consecutive seconds*) and exposed to moving ads on buses and taxis
- People in vehicles who are exposed to fixed ads
- People in vehicles who are exposed to mobile ads (buses and taxis)

Within our core equation we treat everything as a poster in normal daylight conditions and go through the above-mentioned process to calculate the Visibility Adjustment at a contact level.

However, then at the end of the exposure level calculation there are a few other considerations which are accounted for.

# How the Route Visibility Adjustment process works

There is an accounting for illumination. Not all posters are illuminated which means that in hours of darkness they are less viewable (particularly from distance). Until our most recent studies, unilluminated inventory during hours of darkness (which are defined according to the region and month) were subject to a significant penalty factor, though more recent studies in this area with Lumen improved the stimulus material and this has reduced the factors applied. Digital inventory receives a factor greater than 1 in this, however this is not a sliding scale where greater brightness leads to greater factors.

Subsequent research has seen Route / Postar investigate the effect of dynamic content in ads on the overall hit rate. This is dealt with as a factor which is applied at the end of the calculation. The dynamic factor applies to all inventory for which the ads are not static over a fixed period. This means it applies to all digital screens and to scrolling posters. There are two factors which are applied, these depend on the surface area of the ad. A dynamic ad with a surface area over 16.8m<sup>2</sup> is given a factor of 1.5 to the standard VA. A dynamic ad smaller than this receives a factor of 1.2.

All the contacts are then aggregated to give an overall frame level visibility adjustment factor which is then applied to the total traffic who pass through the visibility area to give a measure of impacts.

So, in summary...

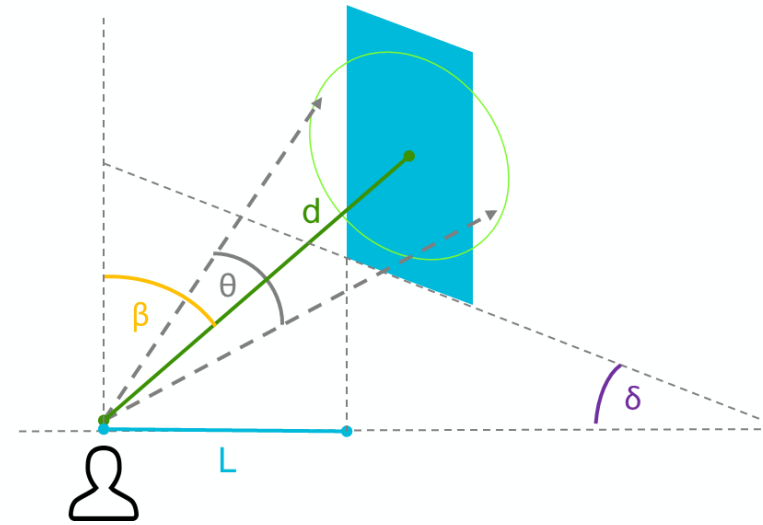
The principle stems from a long line of academic research which has individually tested the effects of various factors on the likelihood of seeing something. For every 0.1 second that people are in a visibility area, we calculate their proximity to the ad and establish a likelihood of seeing the ad

We apply extra calibrations to account for dynamic content and illumination levels

The likelihood of seeing is plotted on a curve which is controlled by a constant  $k$  that varies depending on the mode of transport and the ad type which is being exposed to

The likelihood of seeing is first aggregated at a contact level and then subsequently at a frame level and applied to the total volume of traffic passing through the visibility area to arrive at impact numbers

## The geometry of visibility research



$\theta$  = visible angle (degrees)

$d$  = distance (m)

$\delta$  = deflection angle (degrees)

$\beta$  = bearing (degrees)

$L$  = offset (m)

# Summary

- Impressions are not an adequate measure of OOH audiences
- They better equate to the number of spots within a campaign, or the number of ads playing out on screens
- As a one to many medium, OOH spots (impressions) can be seen by multiple people
- Whereas not all digital impressions are seen
- This means that they have quite different audience funnel trajectories
  - Digital audiences are lower than the impression number
  - OOH ads are higher than the impression (spot) number
- Route's impacts account for this and have visual attention adjustments built in
- They account not just for those who are exposed to campaigns, but rather those who have seen the ads
- This means that Route impacts are the best estimate of actual campaign audience



A close-up photograph of a person wearing a VR headset. The person has a wide-eyed, surprised expression. The image is tinted with a reddish-pink hue. The VR headset has a black strap and a clear lens. A hand is visible at the top, adjusting the headset.

# Seeing is Believing

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