Neuroscience approach to minimizing trespassing deaths on Mumbai’s railway tracks
Until recently, the biggest threats to human life were most likely to be communicable diseases.

Malaria, Influenza, Tuberculosis.
It is now a different scenario.

The major threat to human life today is coronary heart disease.

Road accidents are the largest cause of death among 10-24 year olds.

Source: World Health Organization
All of these problems are caused by **FAULTY HUMAN BEHAVIOUR**

Today, more than any other time in human history, we have to manage behavioural problems more effectively to address persistent social issues
Traditional theories are inadequate in understanding and managing human behaviour

Classical Economics does not consider irrational behaviour of human beings

Psychological theories, including psycho analysis, behaviorism, and cognitive sciences are inadequate to provide a comprehensive explanation of human behaviour

Consumer Marketing professionals use these sciences to guide all their efforts, yet fail 90% of time while launching new products/services

37% of the advertising expenditure of 36 leading marketers in the US goes waste

(Source: What Sticks: Why Most Advertising Fails and How to Guarantee Yours Succeeds; Rex Briggs, Greg Stuart)
Social marketing deals with more fundamental and meaningful issues. It cannot afford to fail with such nonchalance as consumer marketing does.
New sciences to the rescue.

Behavioural Economics has observed & documented irrationality in human behaviour.

In Cognitive Neuroscience, for the first time there is a fundamental science to explain all aspects of human behaviour, even irrationality.
We can harness the real benefits of these new sciences only if we move them out of the academic realm of text books/papers, and into the public domain – applying them in social, policy and business contexts.

This is when we can truly start impacting peoples’ lives in more ways than imagined.
FinalMile Consulting has combined these two sciences to create the practice of Behaviour Architecture™

We have applied these new sciences to bring about sustainable behaviour change for our clients across diverse business contexts – manufacturing, hospitality, e-commerce, packaged goods and industrial and road safety.
FinalMile Consulting has also applied this science to tackle the largest cause of unnatural death in Mumbai City – deaths due to trespassing on Mumbai’s suburban railway tracks.
Every day in Mumbai, close to 10 people are killed by a train while they trespass the railway tracks.

It is the largest contributor of death in Mumbai City - larger than deaths due to road accidents, malaria, aids and swine flu, all put together.
The current approach to minimizing deaths on the tracks is ineffective.

Warning Signs, even in developed countries, are hoping people will listen to instructions and abide. After all, the best way to stop people from dying is to stop them from entering the tracks. Why do they still not listen?
Walls and barriers are erected to physically prevent people from wandering onto the tracks. Yet, why do these walls get broken by the very people whose lives we want to save?

Why don’t people use the foot overbridges that the Railways has built for their own safety?
Why do people still walk into the path of death?
The railway line cuts through Mumbai City, dividing it into East and West. 55% of the residents of Mumbai live in the slums* and many of the slums are beside the railway tracks. Crossing the railway track is the shortest path to get to the other side. It is also the path to the bus stop, their place of work, and for some people, even the Railway Station. Crossing tracks has become a default behaviour because of this situation.

*(Source: Census India, 2001)
Interestingly, as per the records, 85% of the dead are males.
How do we make the trespasser a little more cautious as he crosses the railway tracks?
BRAIN FACT

The human brain cannot visualize one’s death

Source. Scientific American Mind; The End? Why so many of us think our minds continue on after we die, Jesse Bering; Volume 19, Number 5, October/November 2008.
BRAIN FACT

Mirror neurons enable us to empathize with another person’s feelings.

Graphic nature of existing signage does not activate mirror neurons

Source: Mirror neurons and imitation learning as the driving force behind "the great leap forward" in human evolution; V.S. Ramachandran
BRAIN FACT

Synaptic connections in the brain get stronger with repetition.
BEHAVIOUR ARCHITECTURE INTERVENTION 1

Warning Signboard at entry points to make trespasser more cautious:

Don’t show death

Use actual photograph, not graphics.

Repetition of images
The Behavioural Problem:

Human brain has certain limitations, which affect human decision making
BRAIN FACT

The human brain always underestimates the speed of a large object

How can we help the trespasser correctly judge the train’s speed?

Tell them that trains are approaching faster than they think?
BRAIN FACT

The human brain can evaluate speed of an object only with reference to another object.
BEHAVIOUR ARCHITECTURE INTERVENTION 2

Paint yellow lines on the tracks to give speed reference to the trespasser:

The rate at which the yellow disappears under the oncoming train gives the trespasser a more accurate judgement of the train’s speed.
**BRAIN FACT**

The human brain is not designed to do two similar activities simultaneously (The cocktail party effect)

*Source: Some Experiments on the Recognition of Speech, with One and with Two Ears E. Colin Cherry, J. Acoust. Soc. Am. 25, 975 (1953), DOI:10.1121/1.1907229*
BRAIN FACT

As human beings, when faced with danger, the instinctive reaction is only one of two ways. Either fight the fear or flight from it.

On seeing an approaching train the trespasser instinctively runs into the tracks in a bid to escape from the train.

How do we make the trespasser take a conservative decision before he enters the tracks (the danger zone)?
BEHAVIOUR ARCHITECTURE INTERVENTION 3

Whistle Boards at 7 seconds/120m from trespass points

The distance was chosen after observing non-conscious trespass behaviour.

Warn the overconfident trespasser at the right time. Honk with more than 7 seconds to spare before crossing and you are far from being dangerous.

Honk any time less than 7 seconds and the trespasser has already committed to crossing the tracks.
Is there a way to further improve attention to the horn?
BRAIN FACT

Attentional neural activity in the brain peaks at the time of silence in between two musical movements.

Source: Neural Dynamics of Event Segmentation in Music: Converging Evidence for Dissociable Ventral and Dorsal Networks; Devarajan Sridharan, Daniel J. Levitin, Chris H. Chafe, Jonathan Berger, Vinod Menon
BEHAVIOUR ARCHITECTURE INTERVENTION 4

Recommend staccato honking just before trespass points.
The result
Before Behaviour Architecture™ Approach

23

17

9

1

After Behaviour Architecture™ Approach

NUMBER OF DEATHS

JAN-JUNE ’09  JULY-DEC ’09  JAN-JUNE ’10  JULY-DEC ’10

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Applications of Cognitive Neuroscience and Behavioural Economics are changing the way large societal problems, including healthcare, savings, and road safety, are being tackled.

But to get the best of these new sciences we need to have a...

Only 5-10% of our memories are explicit - memories that we are conscious of. Rest of it is in the non-conscious part of the brain and is not accessible to us at a conscious level. Traditional research techniques like focus group discussions and interviews are ineffective in unearthing the non-conscious memories.

Patterns of existing behaviour are the best indicator of the vast non-conscious memories of a human being.

The only way to understand the trespasser is to study them in their habitat. Method acting – crossing the railway tracks as the trespasser does, blending into the environment and observing unbiasedly – sheds light on behaviour that consciously, no trespasser will be able to explain.
2. New Intervention Strategy: Close the awareness-action gap

More awareness will not lead to action. Despite awareness of the dangers of smoking being five times more than reality, smoking goes unabated

(Study by Prof Kip Viscusi, Harvard University)

Instead of focusing on increasing awareness of dangers of crossing of railway tracks or the fact that the trains travel faster than they seem to appear, focused on developing interventions that directly generated action. Only by intervening directly for action, can we effectively initiate behaviour change.
3. New Media Strategy: Work at point of action

Persuading change of behaviour at point of action will work more effectively in solving social problems. Mass media communication is far removed from the place of action and time of action, which proves less effective for creating new behaviour.

By limiting interventions to points where people trespass, our interventions helped create the desired behaviour just at the right moment - the moment of crossing the tracks.
4. New Design Strategy: Sustainable design for the non-conscious

90-95% of human brain is non-conscious. Traditional communication that speaks to the conscious brain is not effective in communicating to the non-conscious brain.

To achieve behaviour change we need to ‘design for the non-conscious’. The use of real photographs, repetition of images, yellow lines as speed references, and the introduction of staccato horn are all examples of interventions that communicates to the non-conscious brain.
Three big takeaways for social marketing:

1. If social marketing has to be more effective, it has to move out of the shadow of consumer marketing. It should be founded on a new and revolutionary theoretical base.

2. The end objective should be to influence behaviour, not encourage opinion. As a result, more focus should be on Action Generation rather than Awareness Creation. Mass Media Communication must give way to Point Of Action Communication.

3. Vast majority of human brain’s processing happens at the non-conscious level. The new design strategy for behavior change calls for developing more interventions that communicates to this non-conscious part of the brain.