

# An Example using the "Scientific Statement" Tool within the New Paradigm

Motorcycle Helmet Effectiveness Revisited." Science or Pseudo Science?

Is the NHTSA study

“Motorcycle Helmet Effectiveness Revisited”

Deuterman et al, DOT HS 809-715, March, 2004

Science or Pseudo Science? We can test to find the answer.



A scientific statement must be measurable and disprovable.

The measurement, or test, of the statement, once done, provides evidence to support, or disprove the statement.

Once disproved, the statement should be abandoned.

# Why is there controversy about helmets?

Often, non-scientific statements are used, ...

... or, scientific statements that have been found false (disproved) are NOT abandoned.



If false,  
stop using  
Statement!

“Motorcycle Helmet Effectiveness Revisited”

**cannot support or refute**

the effectiveness of helmets

because of the following:

This study analyzed fatal crashes of "Two-Up" riders.



Example of Two-Up riders both wearing helmets

This study compared different combinations of the two riders wearing and not wearing helmets.

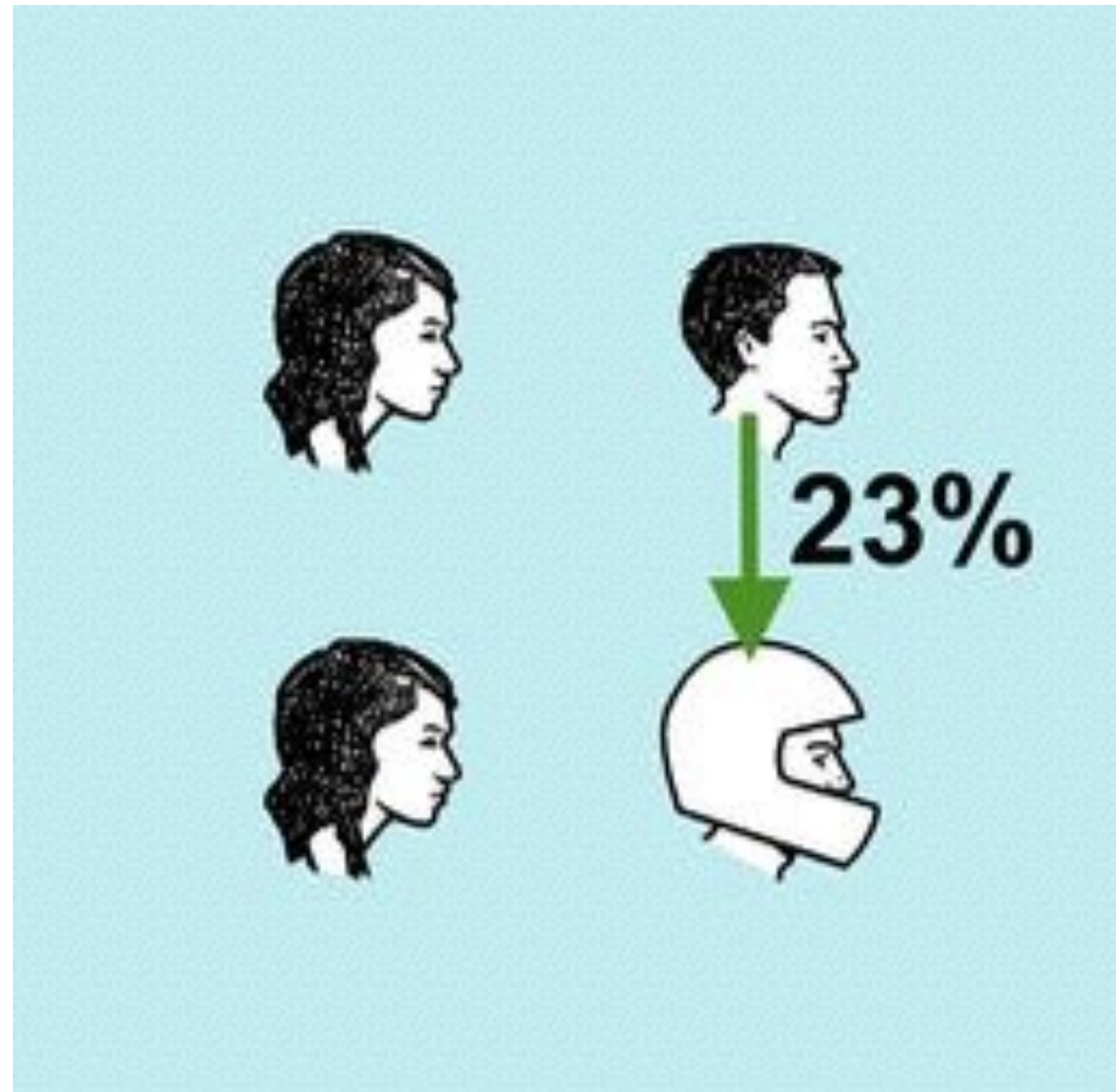
The major premise of the study  
is the following Statement:

*“It is assumed that any difference between  
the fatality ratios for unhelmeted and  
helmeted motorcycle occupants in each of  
the possible scenarios is due to the  
effectiveness of the helmet.”*

**This statement is  
Measurable and Disprovable  
and follows the scientific method technique  
"Statement because Explanation."**

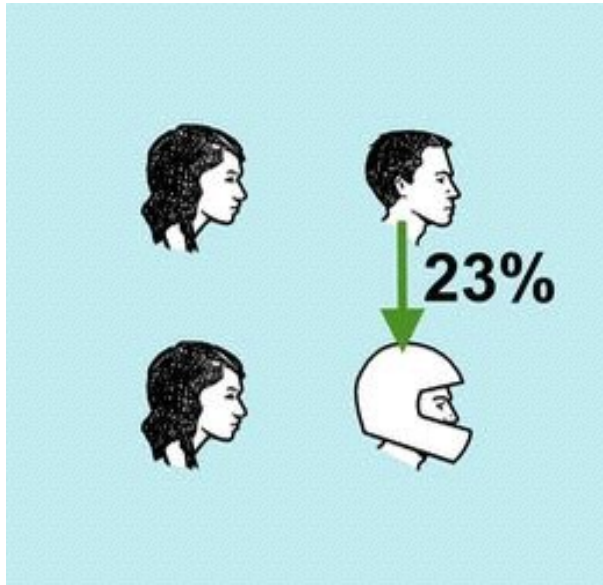
It is a scientific statement.

## Compare Fatality crashes for this scenario:



With the passenger unhelmeted in both cases, the comparison is made between the drivers that were helmeted to the drivers that were unhelmeted.





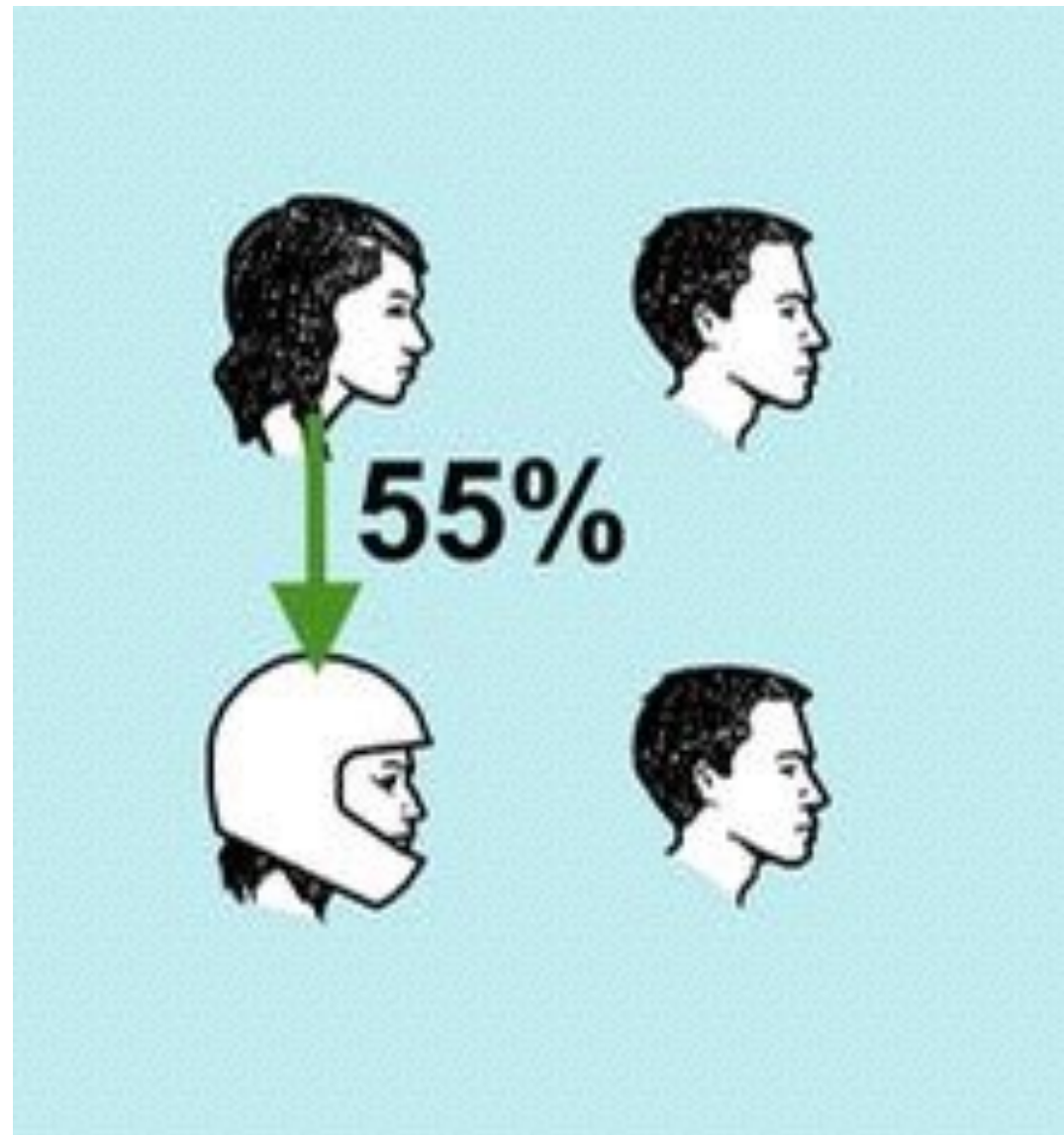
The calculated effectiveness for the driver to wear a helmet is 23% when the passenger is not wearing a helmet.

Let us look at the similar calculation for the passenger, when the driver is unhelmeted in both cases.

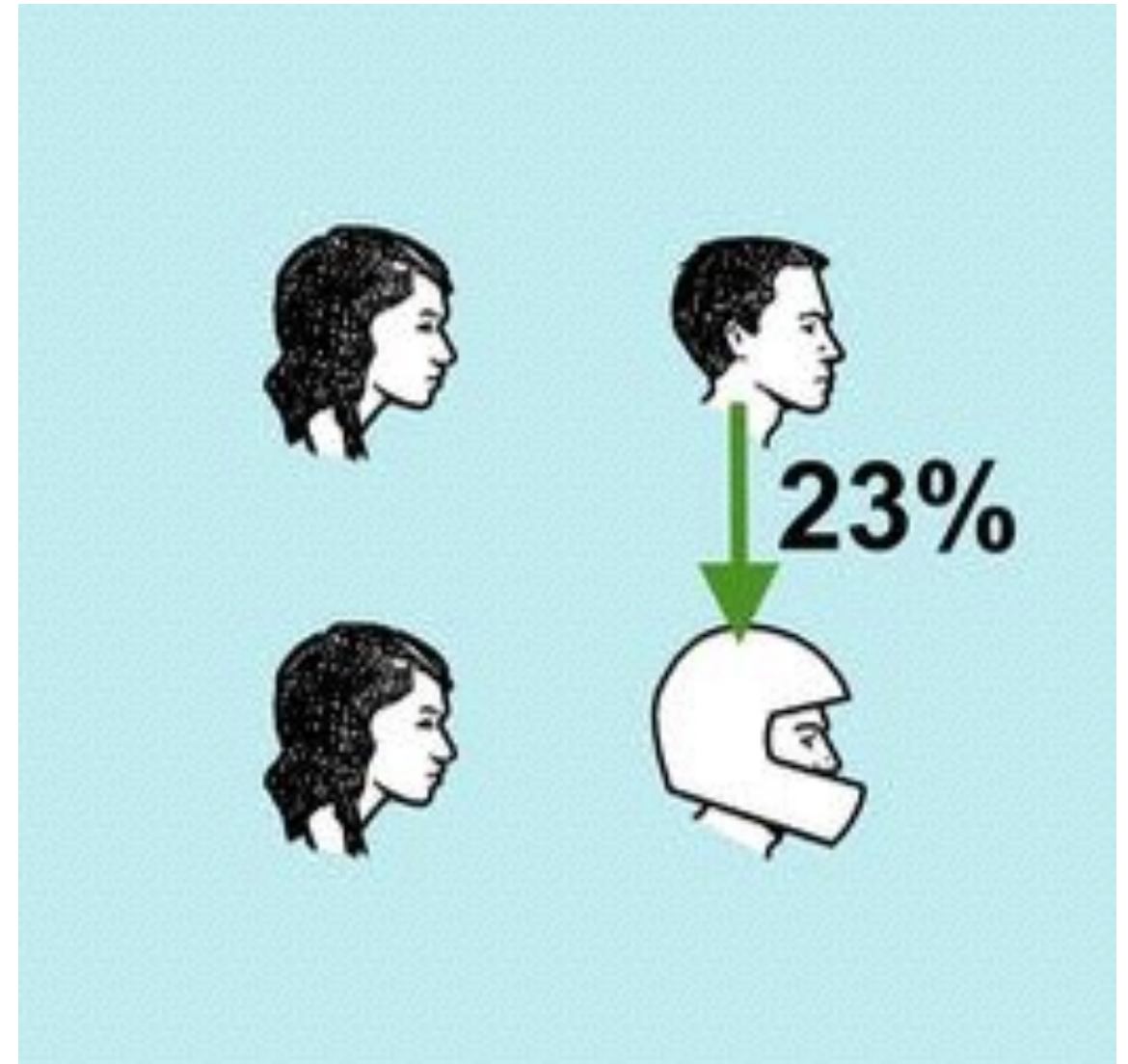
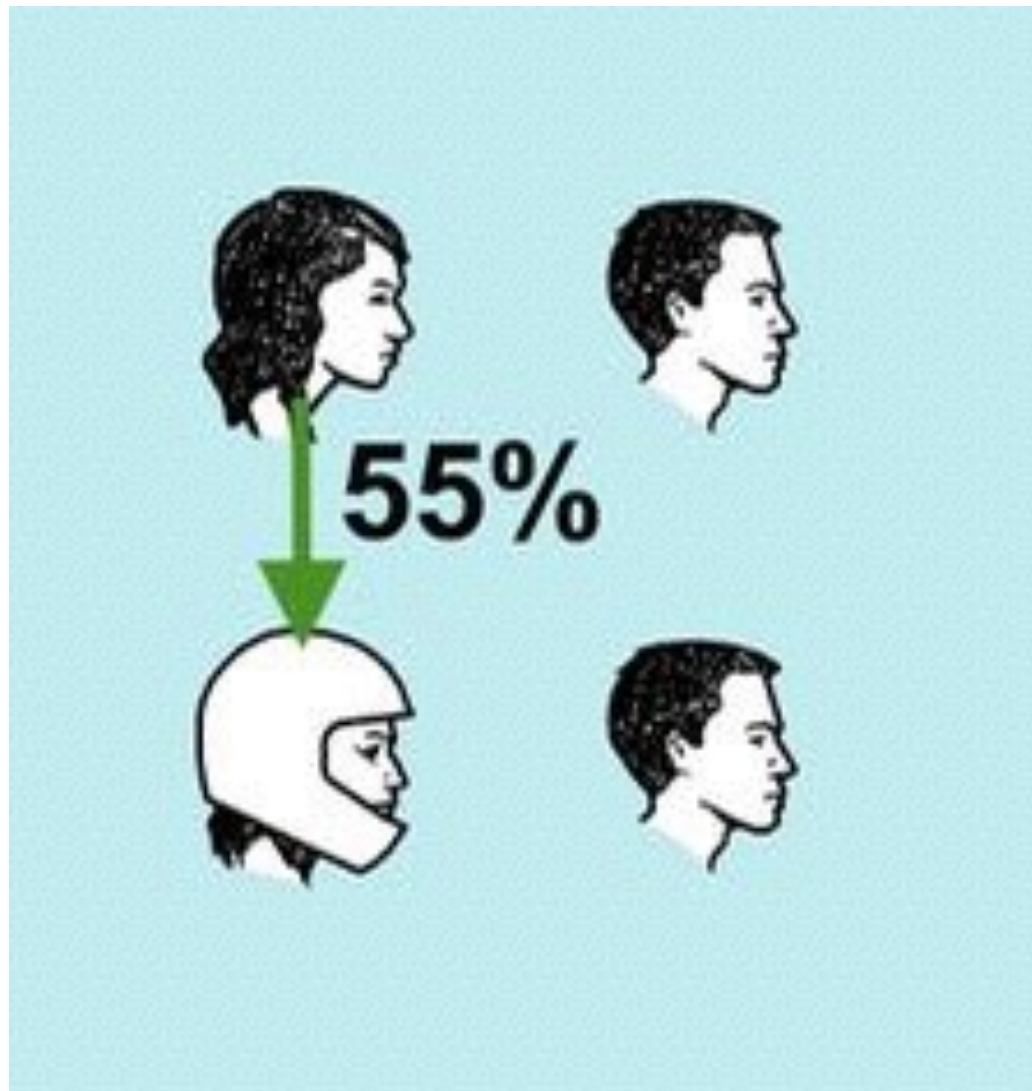
The helmet is assumed to provide the same effectiveness for either position.

If the assumption holds, then helmet effectiveness should not change due to a change in position of the rider.

# Helmet "effectiveness"



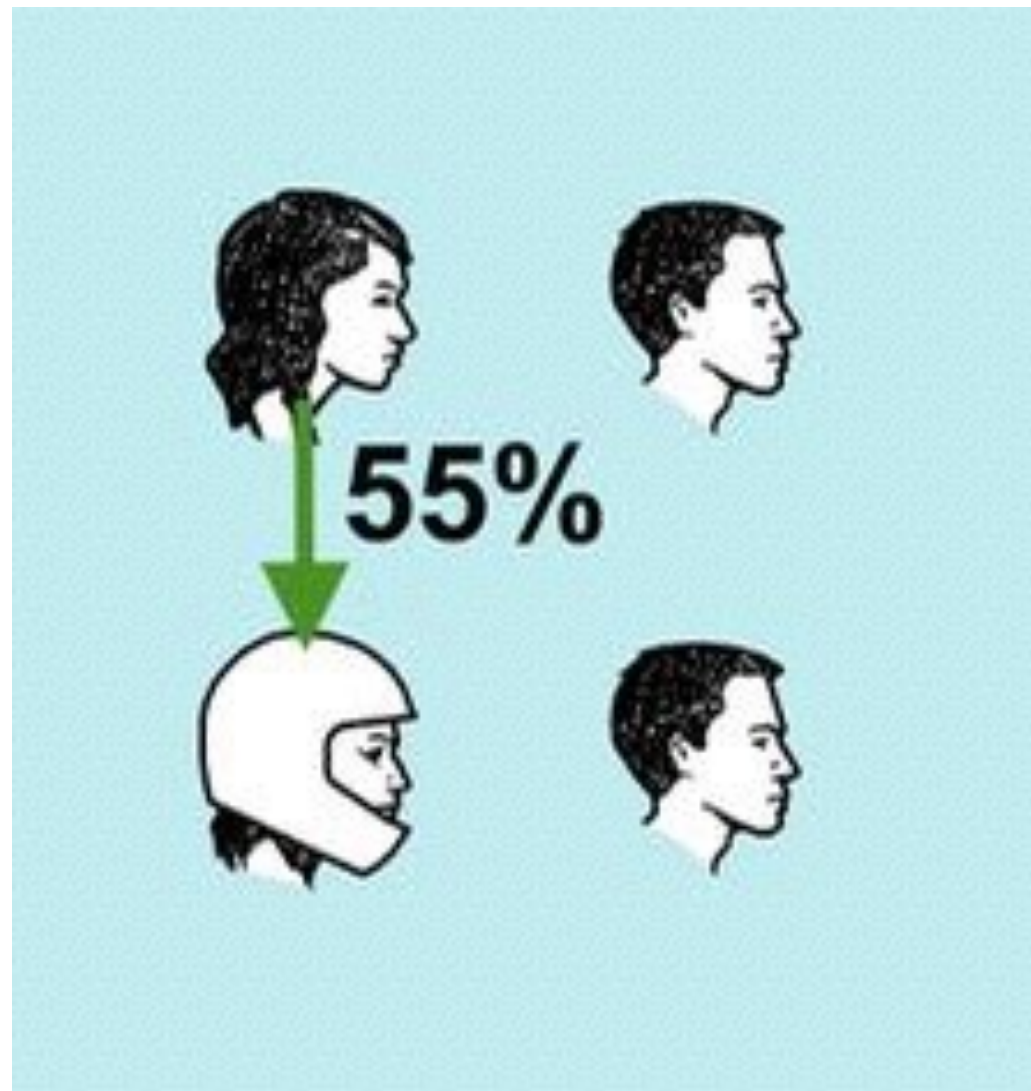
With the driver unhelmeted in both cases.



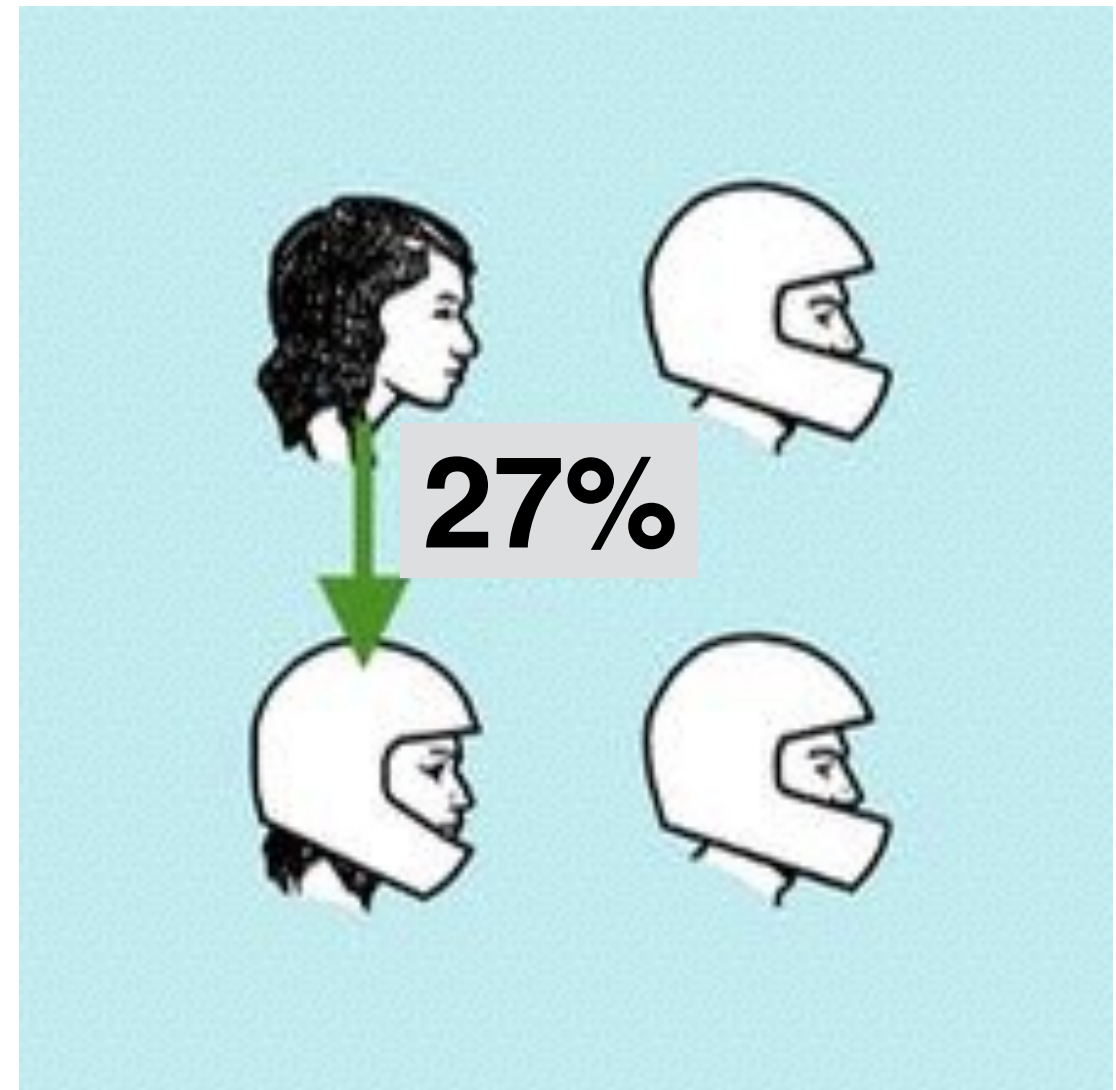
Oops, position changed helmet effectiveness.

Let's check a different way.

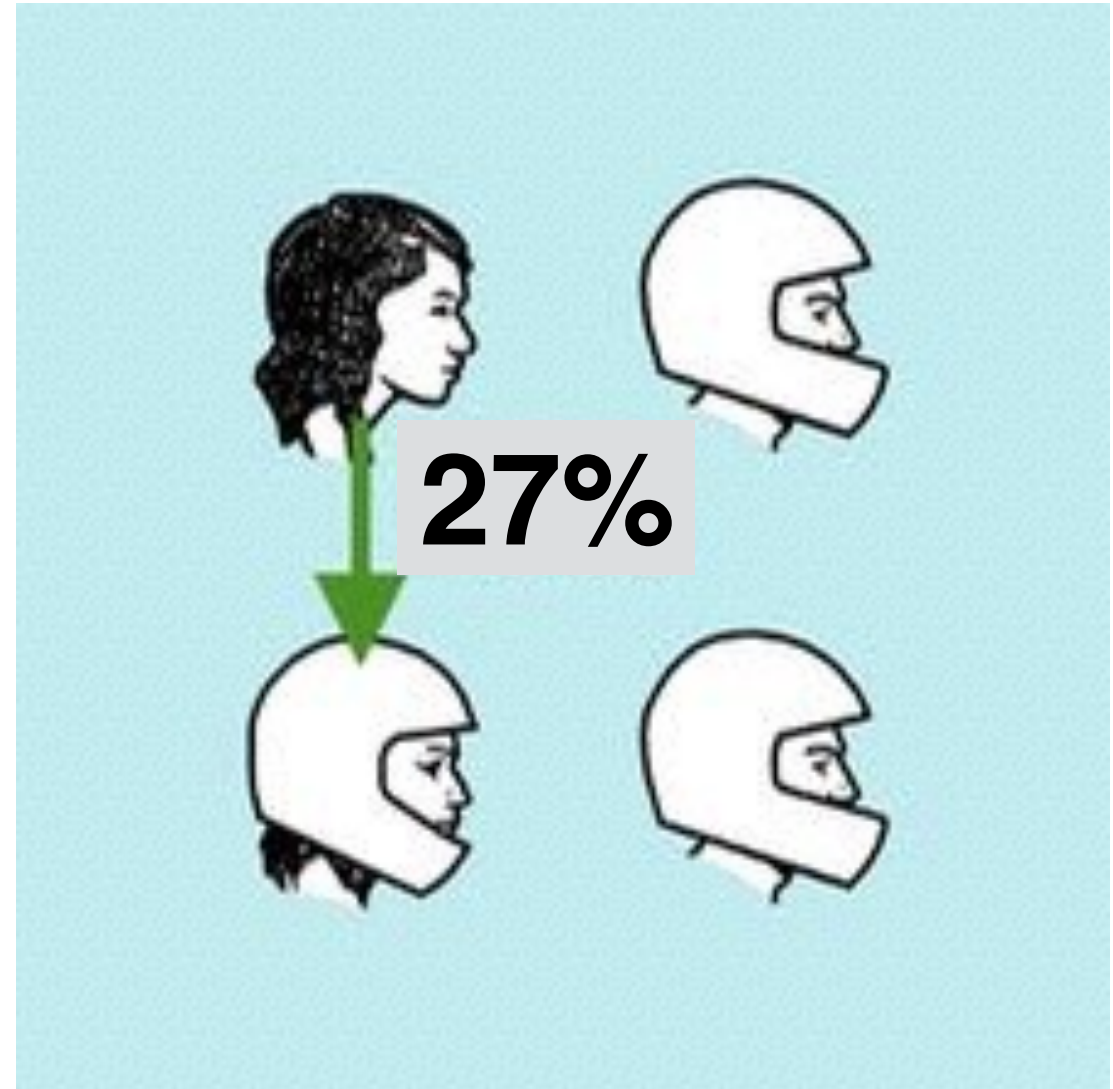
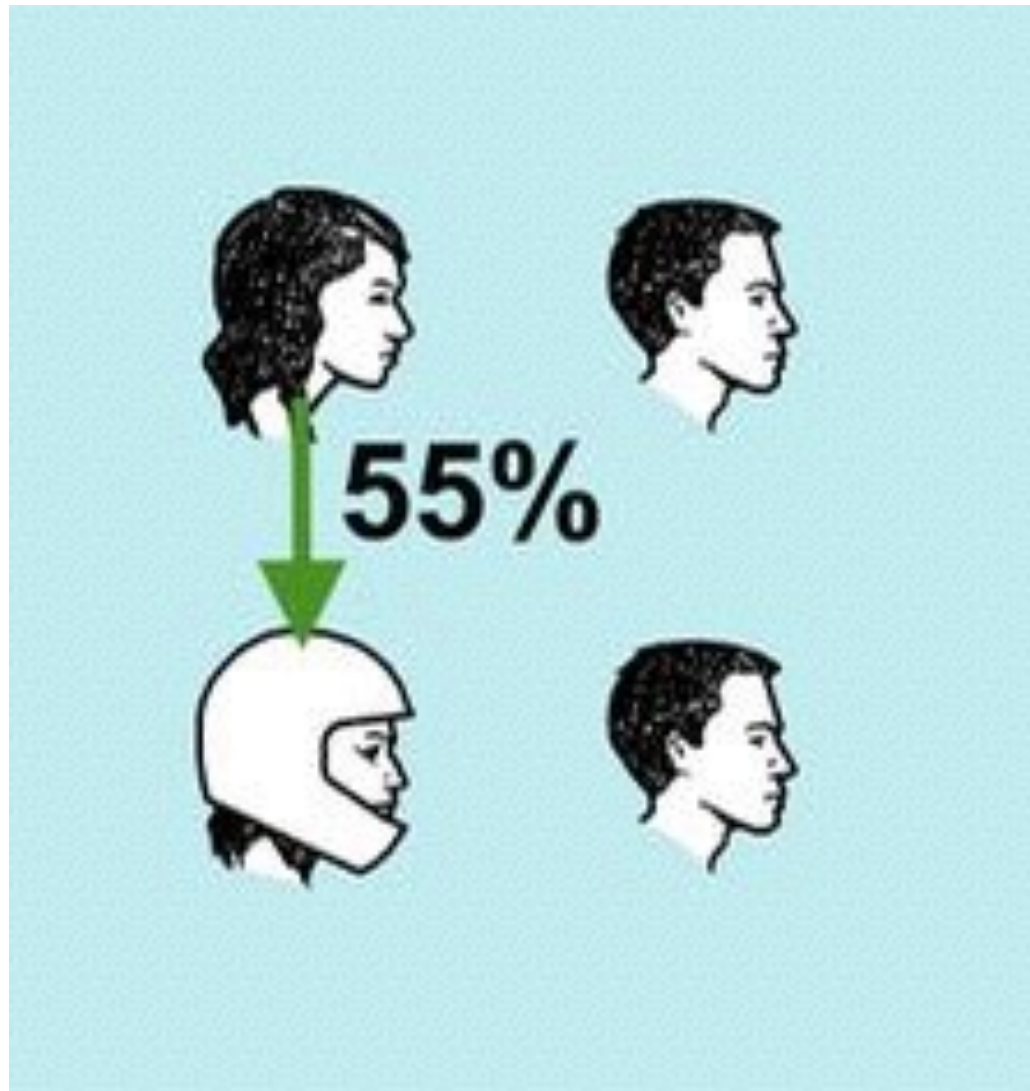
# Does Passenger Helmet "Effectiveness" change when Driver changes helmet?



Driver no-helmet



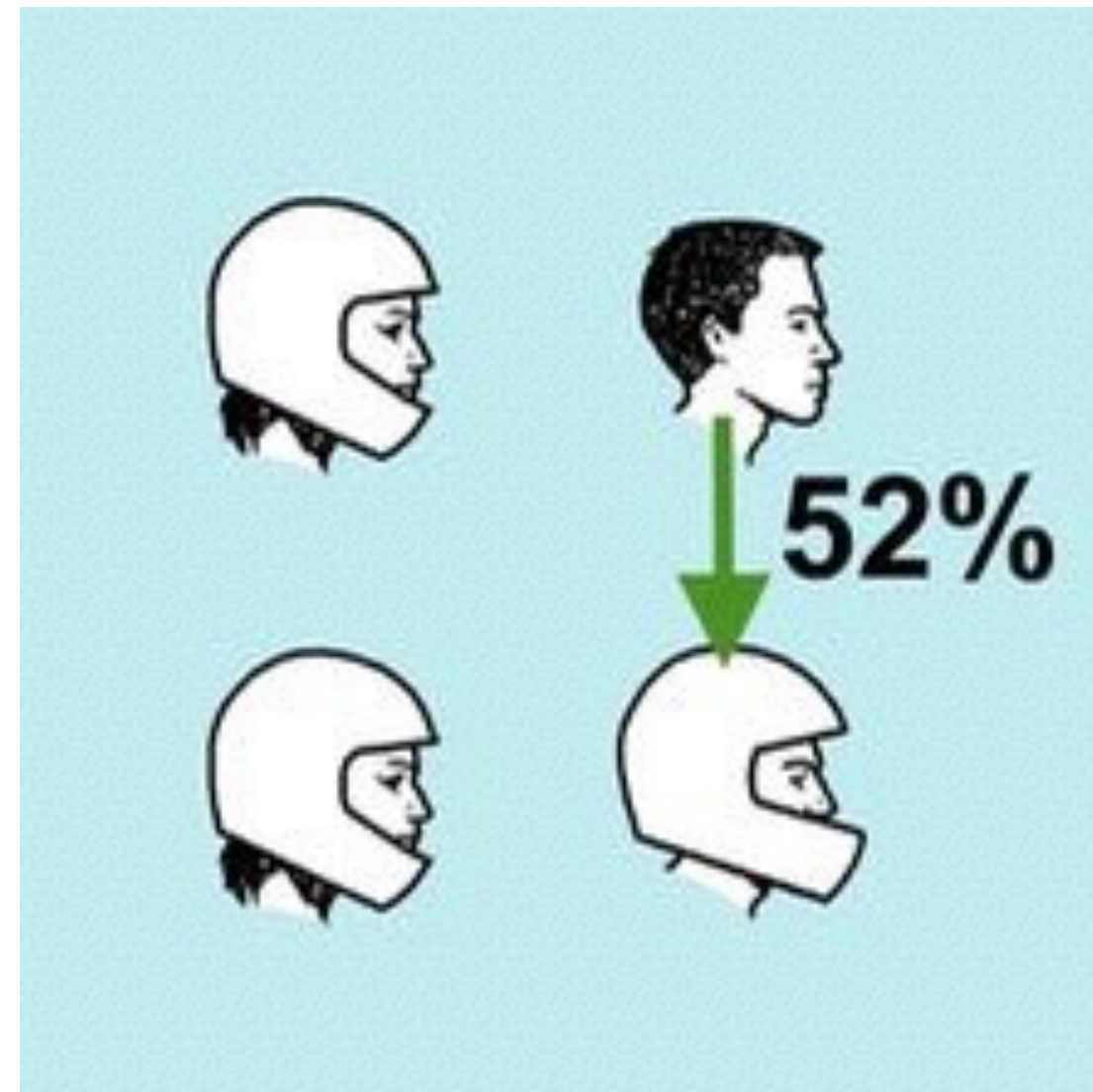
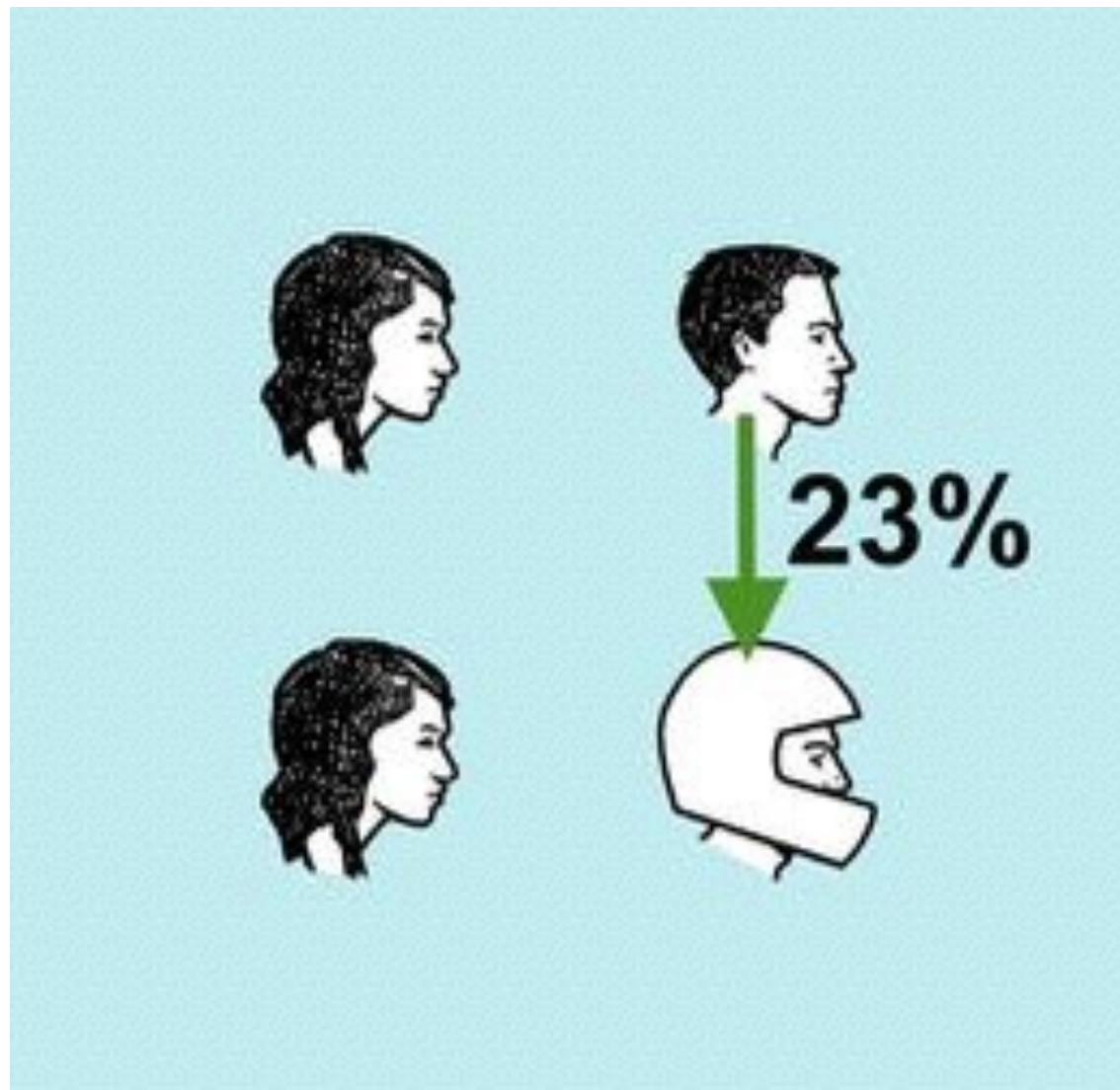
Driver with helmet



Double Oops, driver's choice changed passengers helmet effectiveness.

Let us do the same comparison, but for the driver when the passenger chooses to wear a helmet.

# Driver Helmet Effectiveness



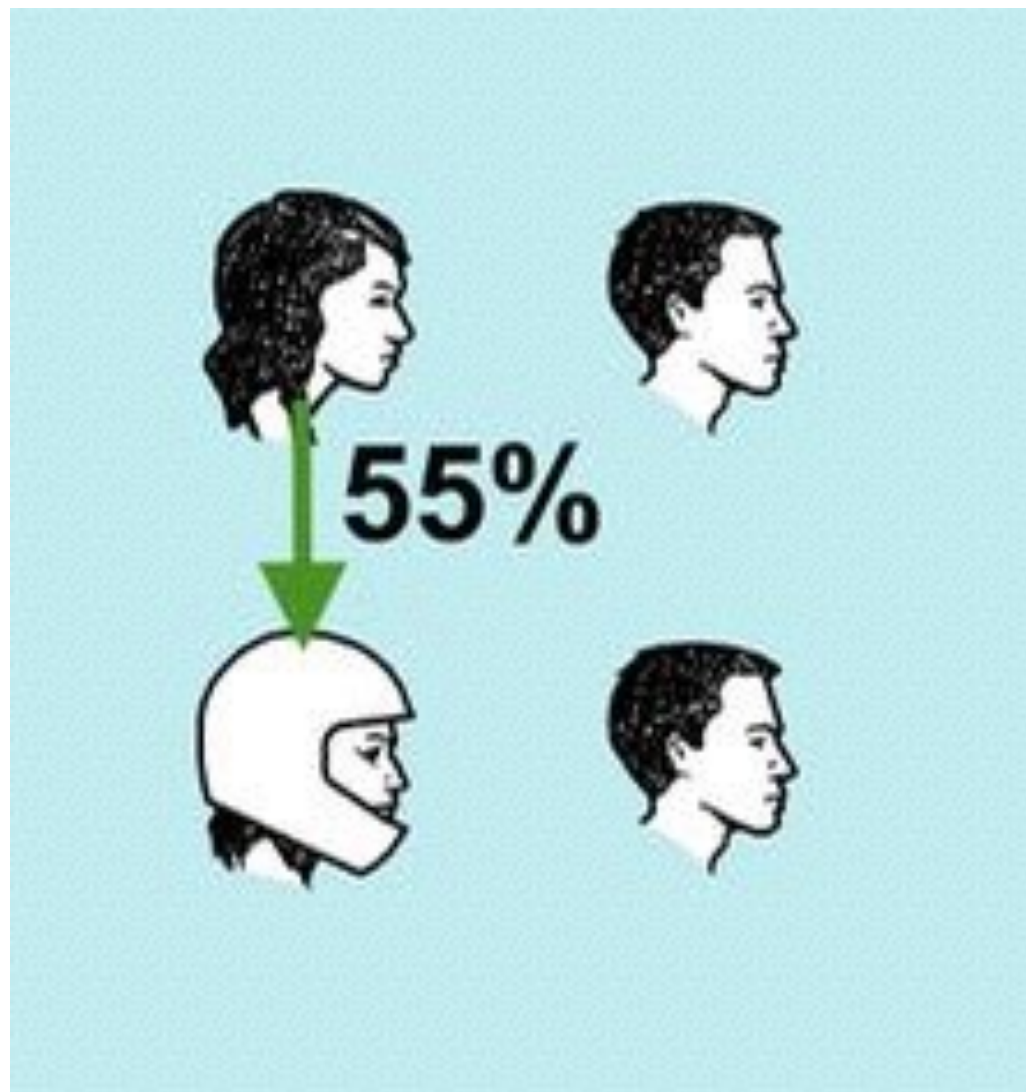
Passenger Unhelmeted

Passenger Helmeted

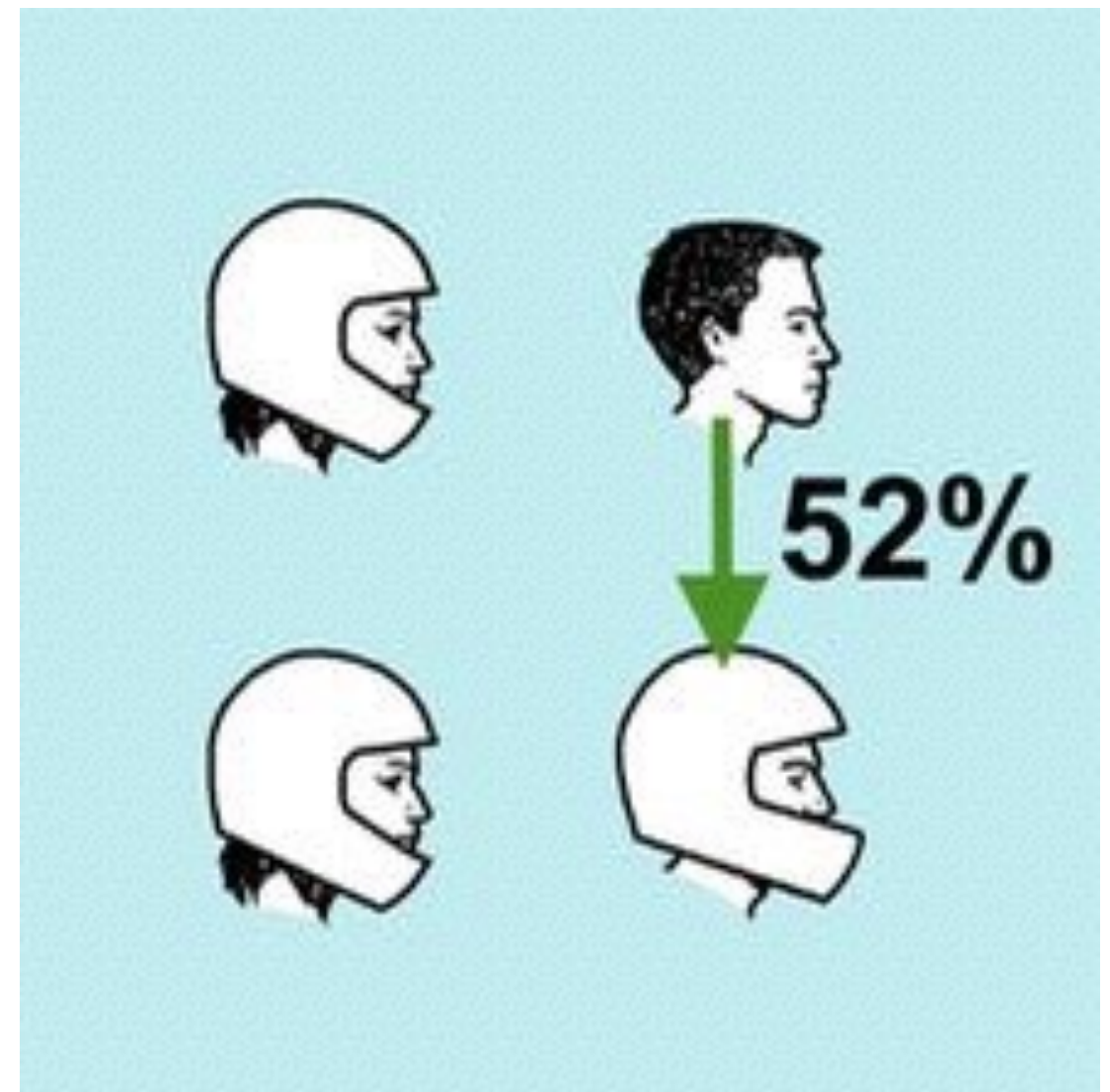
Triple Oops!



Ironically, according to these make-believe scenarios, the passenger should request the driver to **not wear** a helmet; and the driver should request the passenger to **wear** a helmet.



Please Don't wear your helmet for me. If you don't it makes my effectiveness go from 27% to 55%!



Please wear your helmet for me. You wearing your helmet makes my helmet effectiveness go from 23% to 52%!

The NHTSA study

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is not scientific since it violates its fundamental statement.

*“It is assumed that **any difference** between the fatality ratios for unhelmeted and helmeted motorcycle occupants in each of the possible scenarios is **due to the effectiveness of the helmet.**”*

The statement is FALSE, thus:

The two-up method of calculating helmet effectiveness **cannot be used.**



“Motorcycle Helmet  
Effectiveness Revisited”  
cannot **SUPPORT** or **REFUTE**  
the effectiveness of helmets.

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This study  
**should not be referenced,**  
and all articles and papers  
referencing it as  
fact should be considered  
**dubious.**



Alternative: Use science to evaluate helmets.

Example:

"Helmets are designed to reduce skull fractures."

Test: Compare skull fracture rates of helmeted and non-helmeted fatal motorcycle crash victims.

"The group of helmeted dead motorcyclists has a lower incidence of skull fracture than the unhelmeted dead motorcyclists group." This statement is measurable and disprovable, and the explanation is difficult to manipulate.