The Value of Checklists and the Danger of Scripts: What Legal Training Suggests for Testers

Cem Kaner, J.D., Ph.D.

Professor of Software Engineering

Florida Institute of Technology

Summary

Exploratory testing is a general approach to testing, including all aspects of product/market research, test design, execution, troubleshooting, result reporting, etc.

To see what is different about exploratory testing, contrast it with its opposite, scripted testing. In practice, most testing that people actually do probably sits in the middle, somewhere between pure exploration and perfect scripting.

My bias is that most of the best testing sits a lot closer to the exploratory side of that continuum. And yet, I tell people they should use checklists to structure their work. How can that be? Aren't checklists really just abbreviated scripts?

As a law student, and then as a lawyer, I relied heavily on detailed checklists and task outlines and templates for forms, but we were trained to use them as aids to critical thinking in the moment, rather than as directives to be followed. This talk considers that distinction, and how it has helped me approach many testing tasks in a way that provides structure but doesn't restrict exploration.

How this talk came about...

http://www.newyorker.com/reporting/2007/12/10/071210fa_fact_gawande

http://www.nytimes.com/2008/01/22/health/22brod.html

Specific examples seemed straightforward, not very complex, like bug advocacy RIMGEA, but popular press can't be too complex.

Reports of the value of medical checklists carried into blog / email discussions of the value of scripts and risks of exploratory testing.
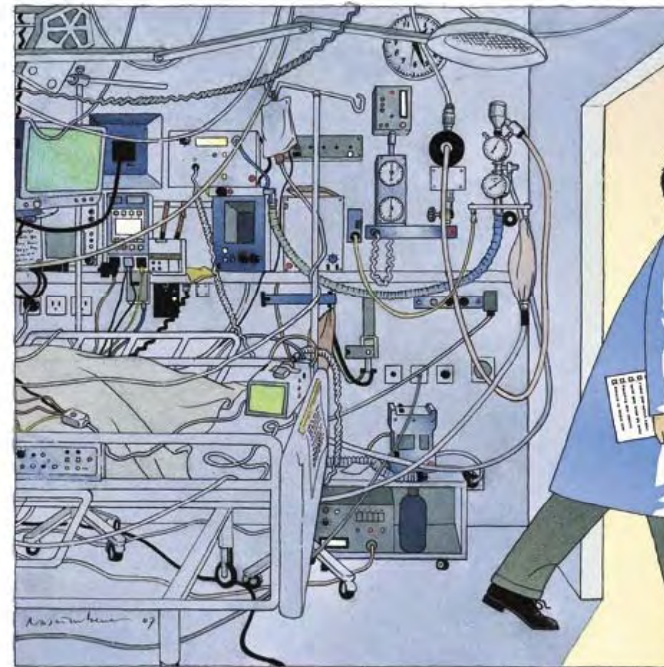
THE NEW YORKER

ANNALS OF MEDICINE

THE CHECKLIST

If something so simple can transform intensive care, what else can it do?

by Atul Gawande

DECEMBER 10, 2007

If a new drug were as effective at saving lives as Peter Pronovost's checklist, there would be a nationwide marketing campaign urging doctors to use it.

Checklists ≠ Scripts

Reports of the value of medical checklists carried into blog / email discussions of the <u>value of scripts</u> and the <u>risks of (unscripted) exploratory testing</u>.

- I'm not a doctor -- I can't speak to medical checklists.

- But the descriptions in the articles looked to me more like legal checklists than software testing scripts.

- I am a lawyer, and I can say with confidence that in THAT field:

  - Checklists are tremendously valuable and lawyers would often be fools not to use them

  - But checklists are NOT scripts

  - Checklists like the ones used by lawyers are entirely compatible with exploratory testing—explorers often do and often should use checklists to guide and track their work.

Quick explanations of the differences were surprisingly ineffective for some readers

I think the difficulties lie in persistent myths about the natures of

- Exploratory Testing, and
- Scripting.

We can explore these together at CAST

- And if things seem a little "over the top" in this talk – remember, this is a meeting designed to stimulate open debate, so don't be shy about presenting an alternative view.

Exploratory software testing

- is a style of software testing
- that emphasizes the personal freedom and responsibility
- of the individual tester
- to continually optimize the value of her work
- by treating
  - test-related learning,
  - test design,
  - test execution, and
  - test result interpretation
- as mutually supportive activities
- that run in parallel throughout the project.

> **WE'LL RETURN TO THIS DEFINITION LATER...**

Some common misunderstandings...

- **No, ET is not only manual testing**. Explorers can use any tools they want.

- **No, ET is not only black box**. Explorers can work with the program at any level, using any information.

- **No, ET is not only test execution**. Sometimes explorers beat on the keyboard or do standardized "attacks" (quicktests), but explorers often develop tests and test strategies with studies of the product, the platform, the market and other risks.

- **No, ET is not completely undocumented**. Explorers create whatever documents are useful for their purposes....

Including checklists.
But (almost) never scripts.

What are scripts?

I keep hearing that

- scripts are "best practices" and that

- following standards that push scripted testing is the "professional" approach to testing.

Scripted testing

A script specifies

- test entry conditions

- test operations

- expected results

- comparisons the human or machine should make

Scripts can control

- manual testing by humans

- automated test execution or comparison by machine

Test Scripts (from the latest IEEE 829)

3.1.41 test case: (A) A set of **test inputs, execution conditions, and expected results** developed for a particular objective, such as to exercise a particular program path or to verify compliance with a specific requirement. (B) Documentation specifying inputs, predicted results, and a set of execution conditions for a test item. [B2]

3.1.49 test procedure: (A) **Detailed instructions for the set-up, execution, and evaluation of results for a given test case**. (B) A document containing a set of associated instructions as in (A). (C) Documentation that specifies a sequence of actions for the execution of a test. [B4]

ANSI/IEEE Std P829-2007, July 30, 2007

Draft IEEE Standard for software and system test documentation

Here's the kind of detail you find in a script

1 __ Pull down the File menu

2 __ Select Print

3 __ The program displays the Print dialog

4 __ Enter 2 in Number of copies

5 __ Enter a check in Collate

Another variation (my style, in the early1980's):

Step #	Check-mark	What to do	What to see	Design notes	Observation notes
1.	____	Pull down the File menu	File menu down	*Test author's comments*	*Tester's notes at run-time*

I first studied scripted behavior (unintentionally) in 1977

How do Fornix-Fimbria
Lesions Affect One-Way
Active Avoidance
Behavior?

Cem Kaner, Bob Osborne,
Harvey Anchel, Mark
Hammer & Abraham H. Black

McMaster University

86th Annual Convention of
the American
Psychological Association

Toronto, Canada, August
28, 1978

- We were comparing behavior
  - in a simple maze
  - by normal rats and
  - rats with fornix-fimbria lesions that destroyed the hippocampus.
- We expected to see identical behavior across groups. That's not what happened, and so we videotaped the sessions and analyzed the rats' movements (and some other behaviors) in great detail.
- Here's what we found…
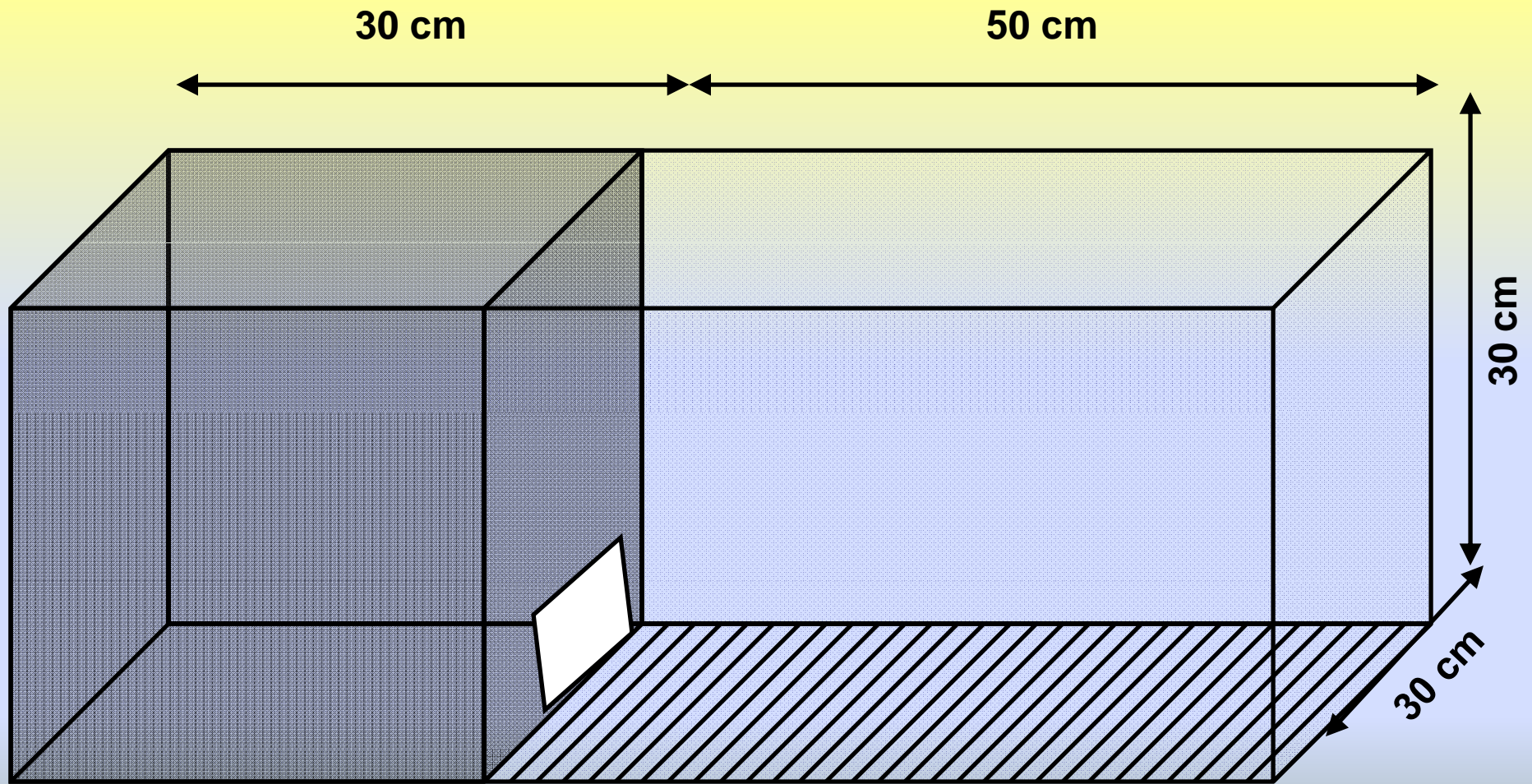
Normal, hooded rat (*rattus norvegicus*) raised in our lab

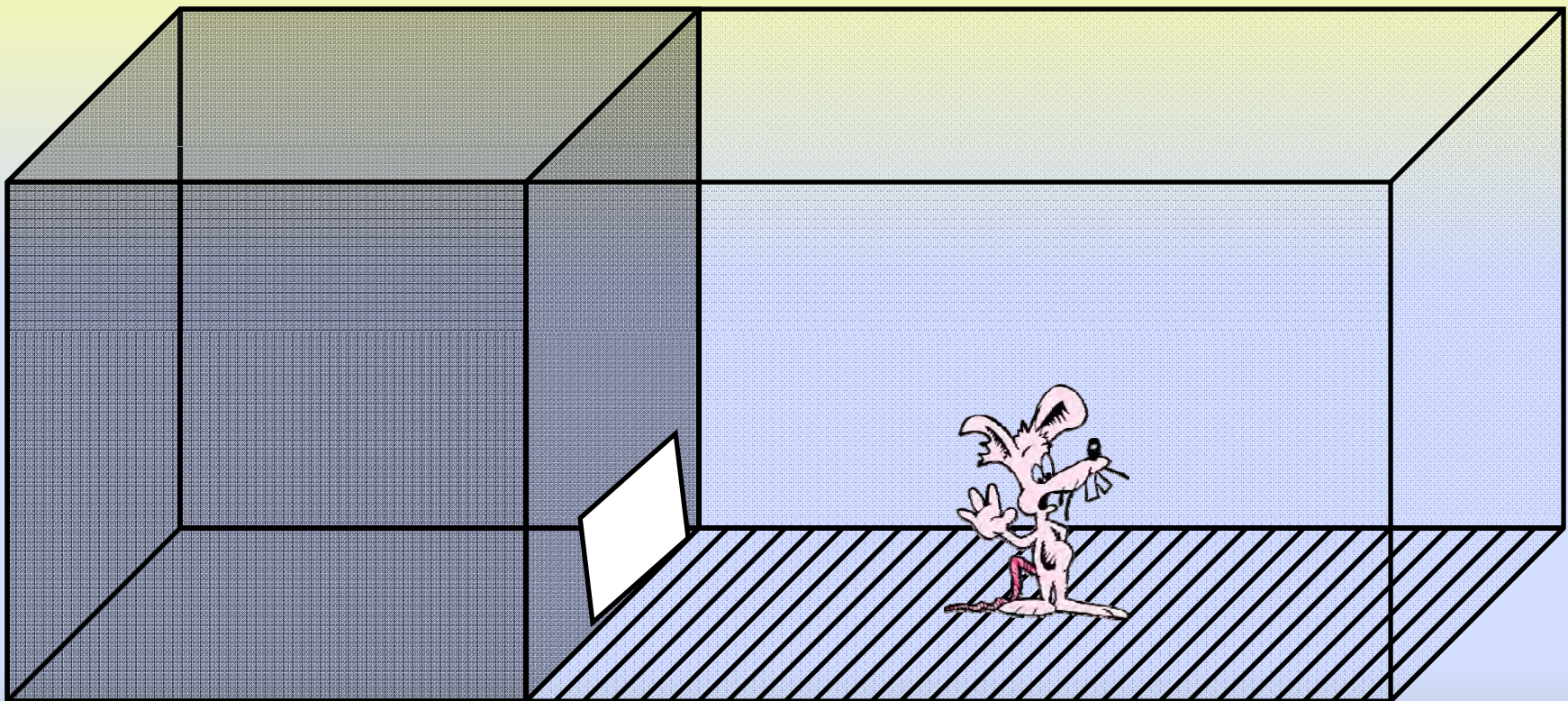Another rattus norvegicus, but with a lesion of the fornix, which causes damage to the rat's hippocampus.

- *affects (among other things) the rat's short term memory and its ability to interpret its location in space*

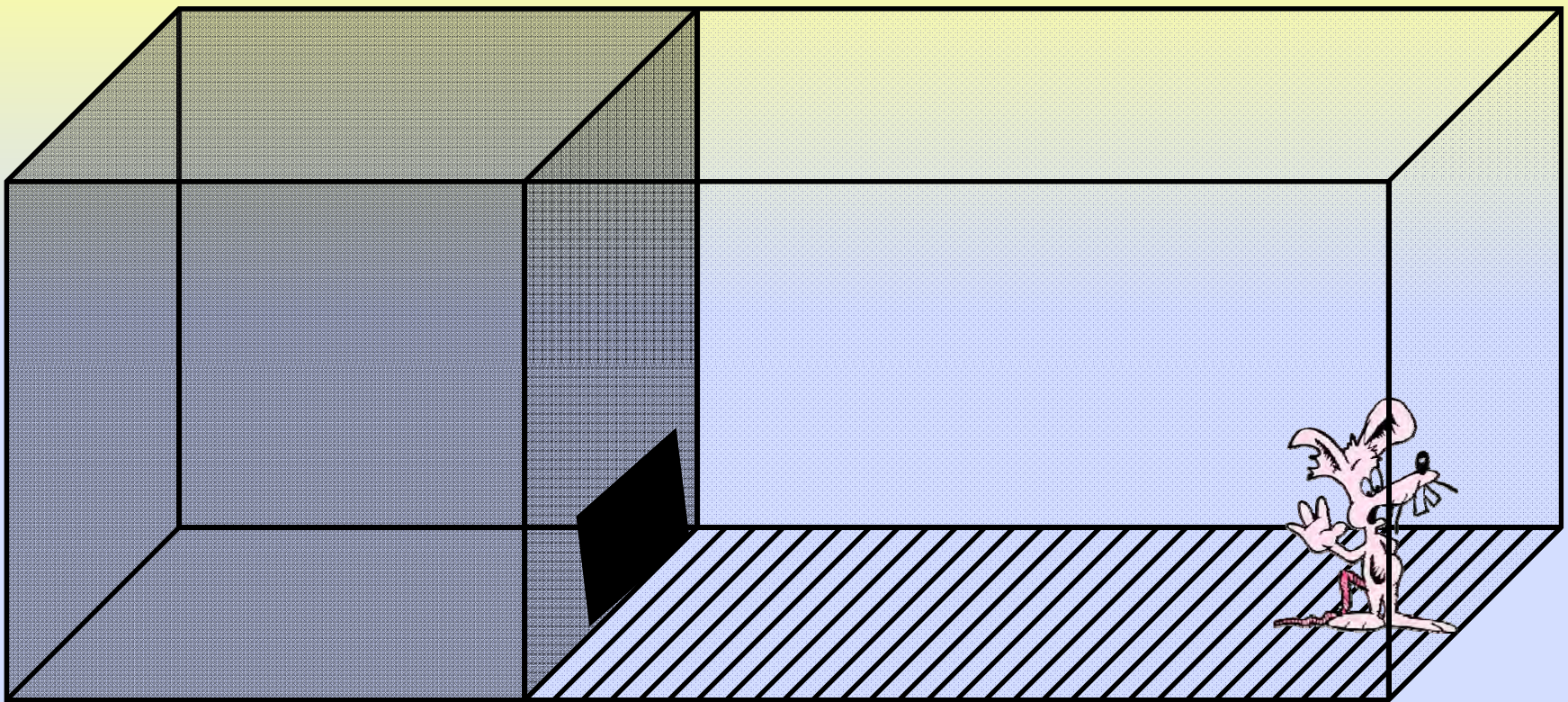# The experimental chamber

30 cm   50 cm

30 cm

30 cm

Initialize the experiment:
- 1 minute of initial exploration
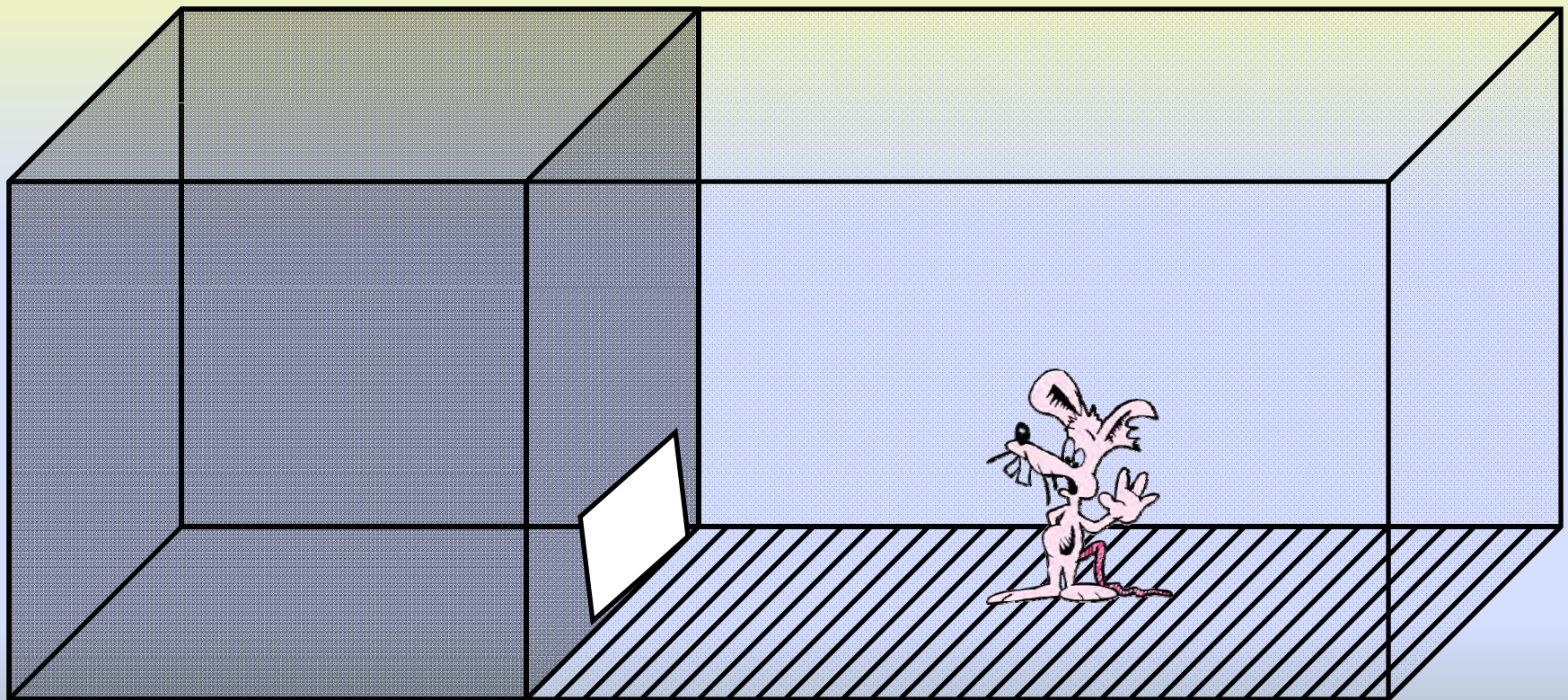- Then start as soon as he enters the black side

Put him in the white section
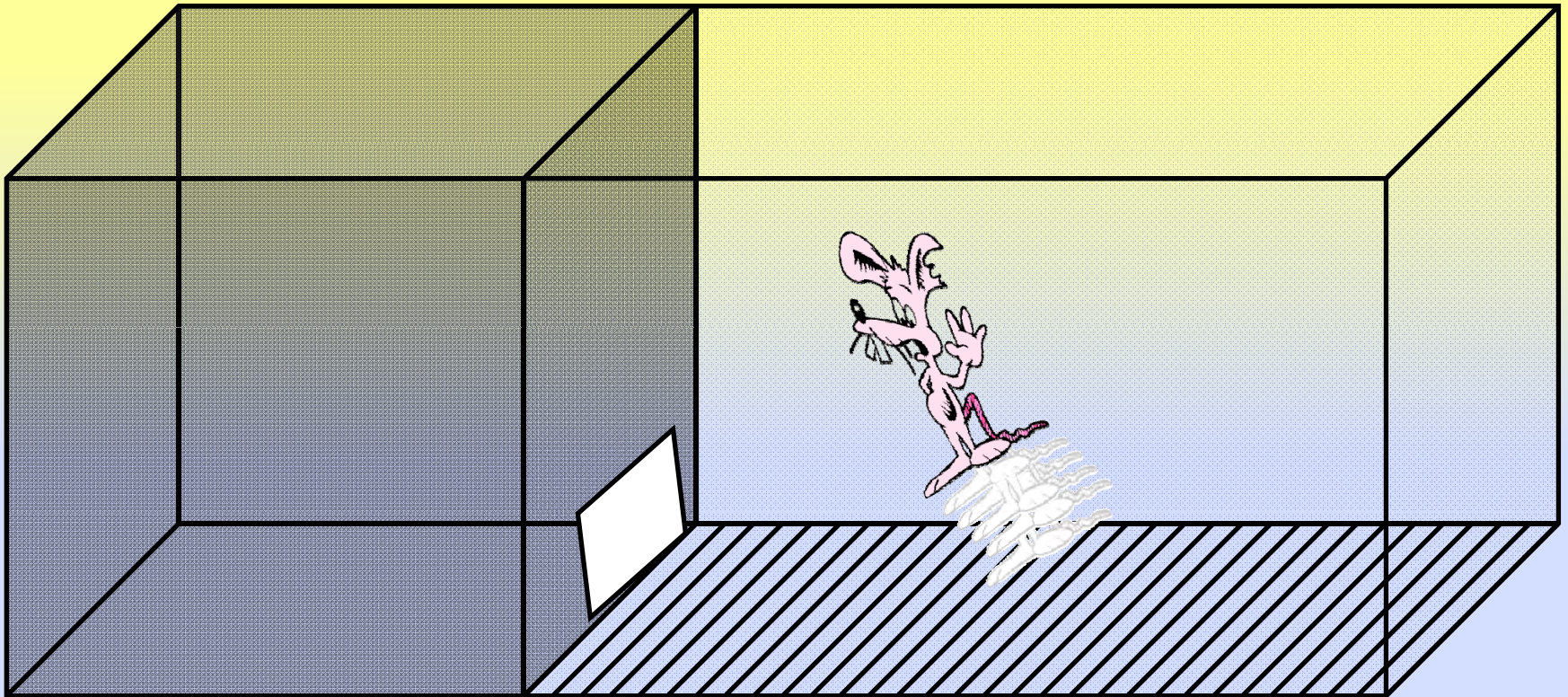- away from the door
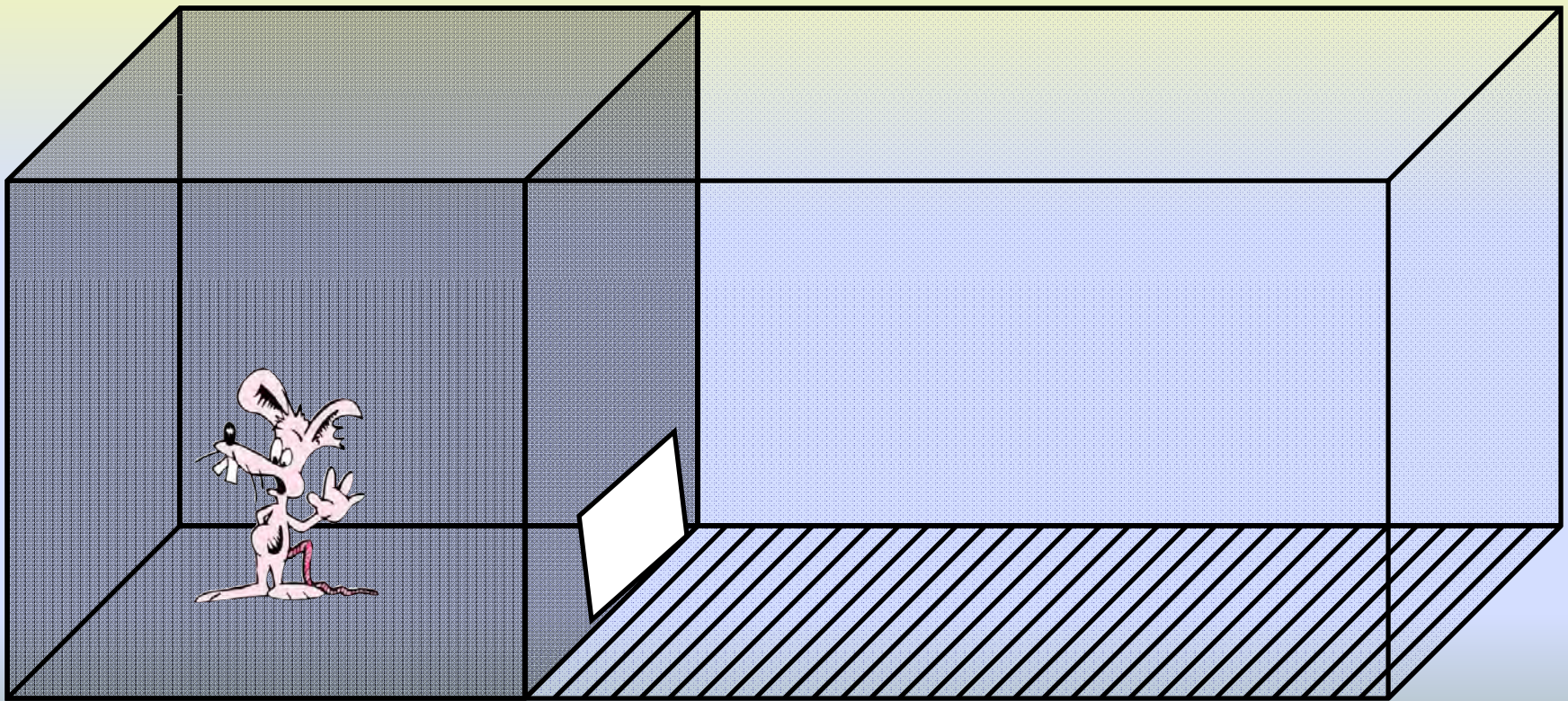- facing away from the door

He explores.
After 16 seconds, the buzzer sounds and we
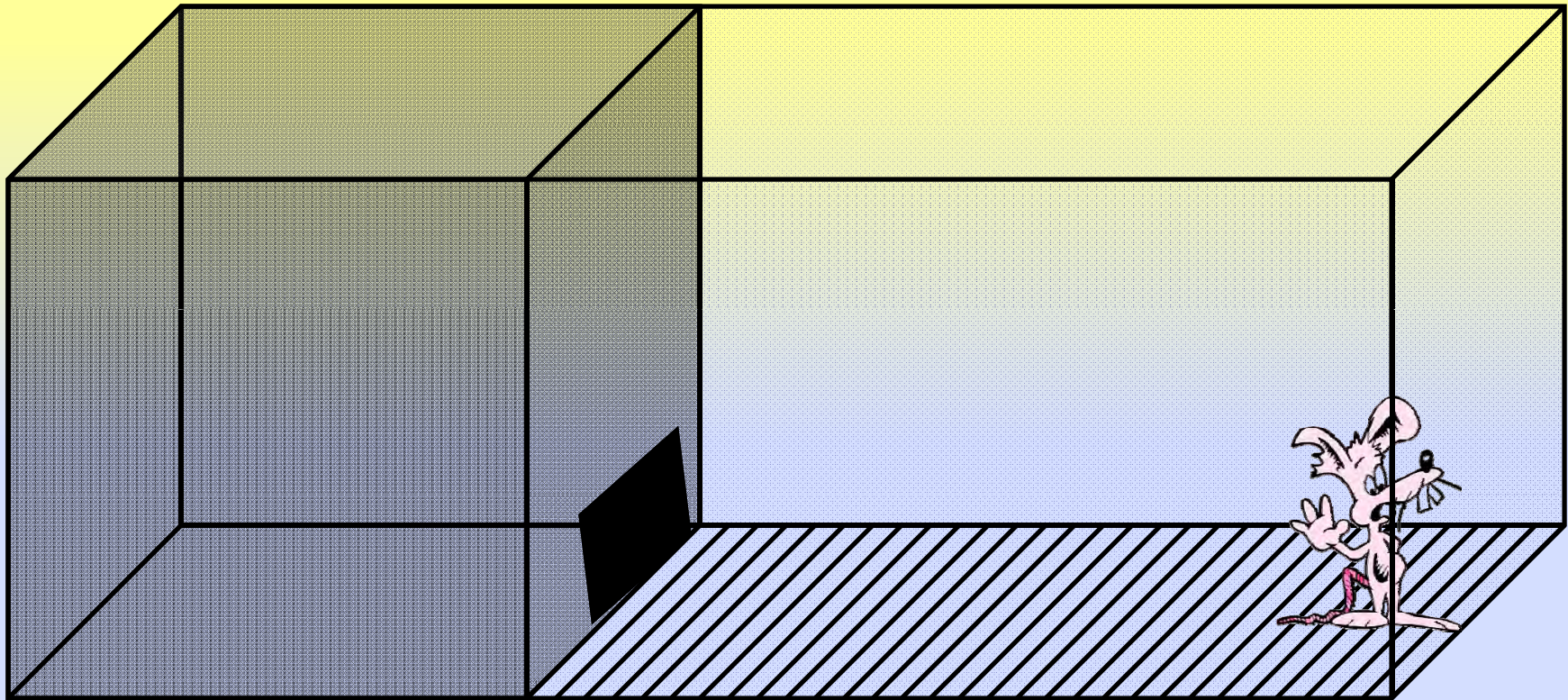open the door to the dark side.
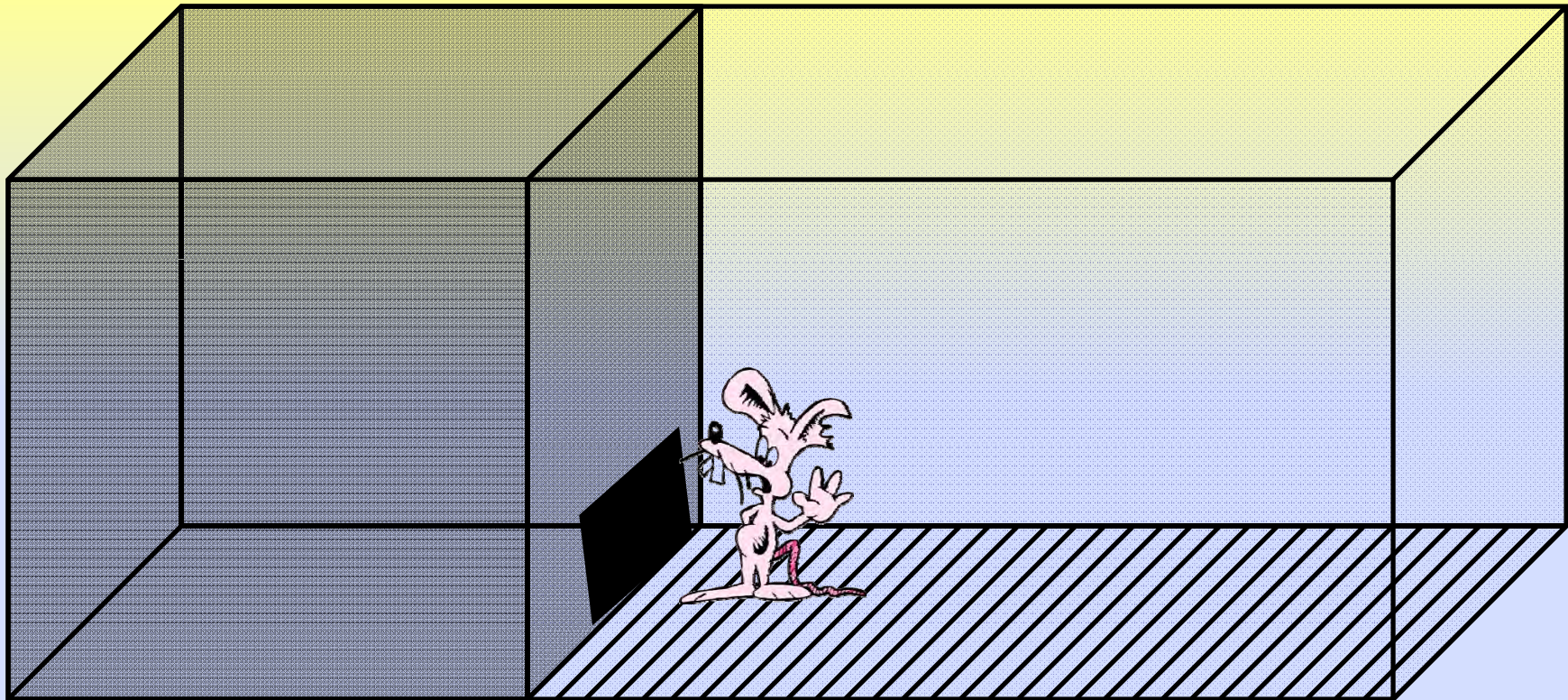
5 seconds later, Eeek! A shock.

He bounces and runs
until he gets to the dark side
where there is no grid and no shock

A minute later, we start again

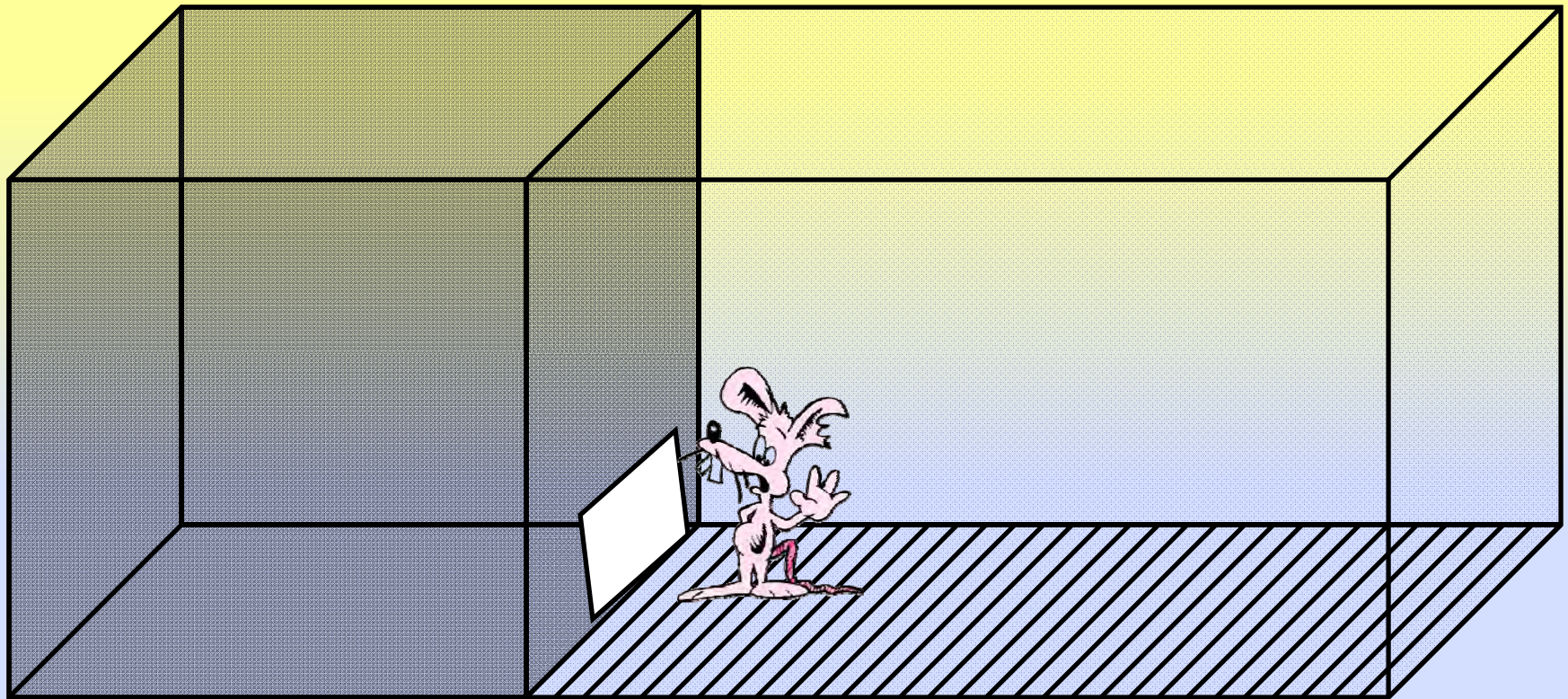This time, he comes to the front right away, sometimes chews or pulls on the closed door, trying to drag it open

When the door opens …

He runs to the dark side and stays there
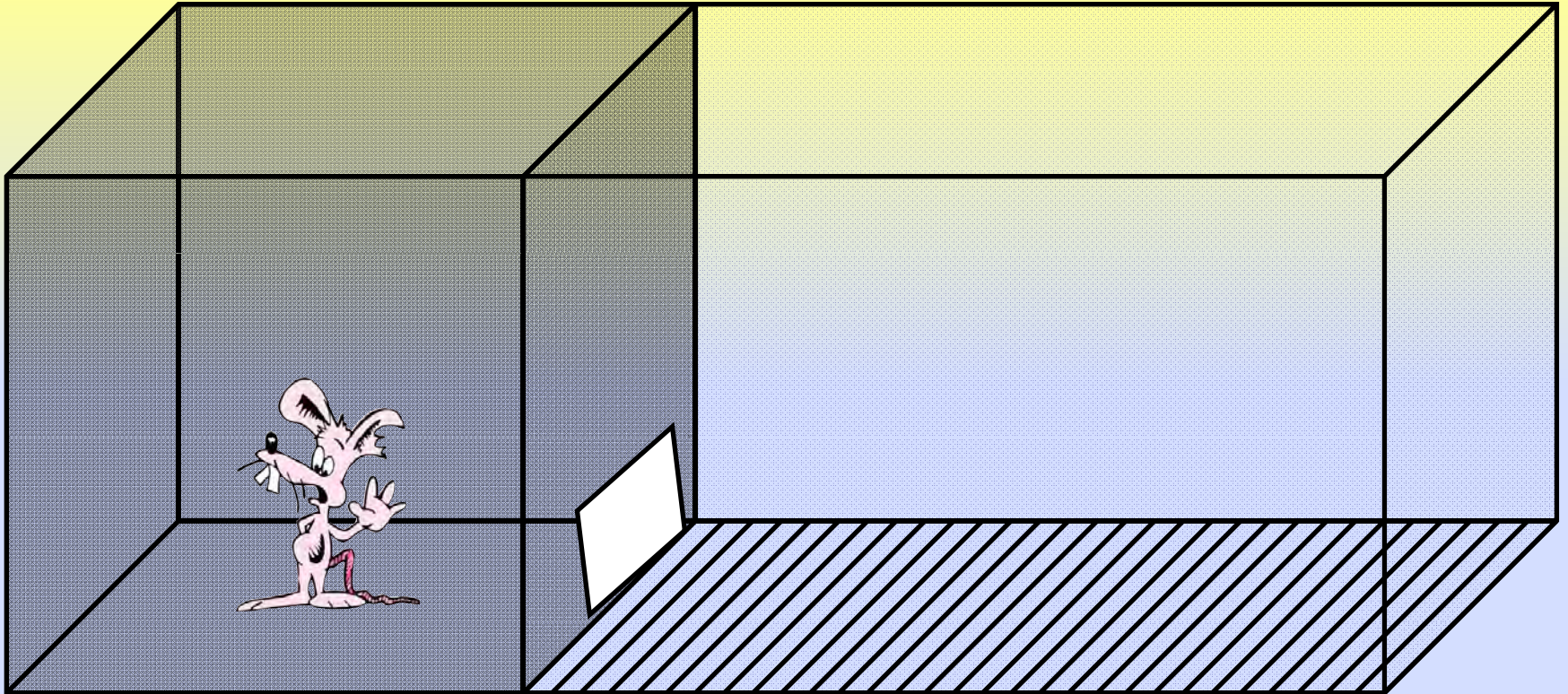
The experiment with the lesioned rat starts the same way.
 • Let him explore first,
 • then position him away from the door
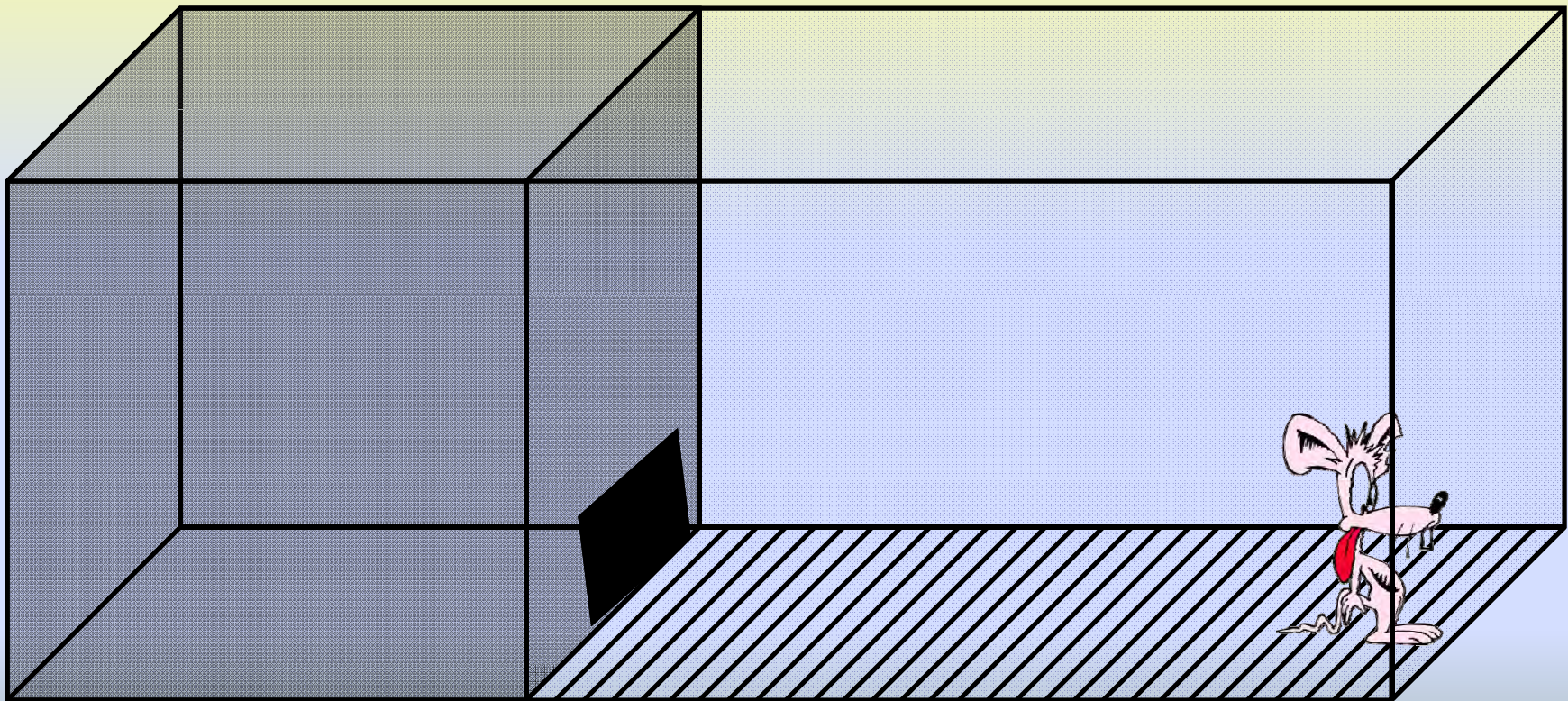
The 16 seconds, then buzzer and open the door, then 5 seconds, then:
        Eek! Ouch! Bounce!
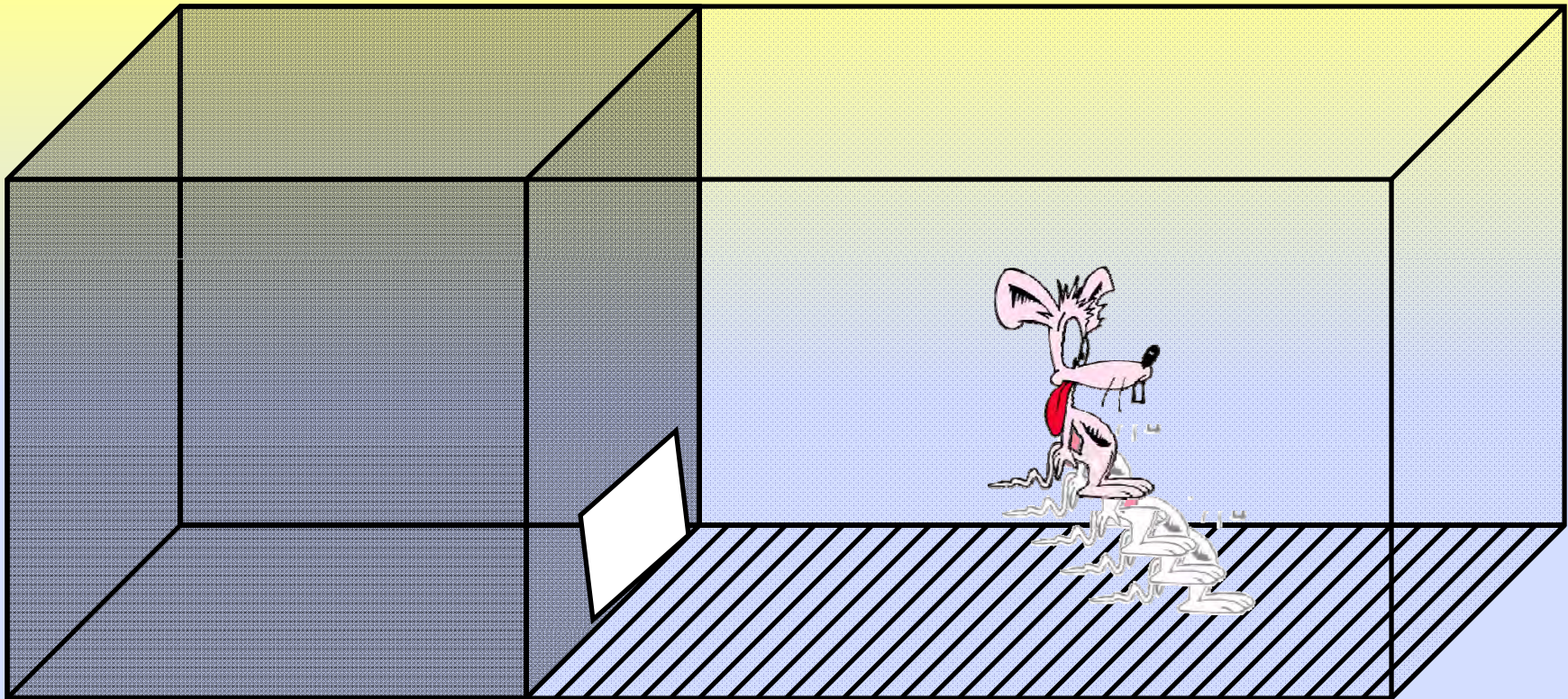
Safe, at last. Looks just like the normal rat.
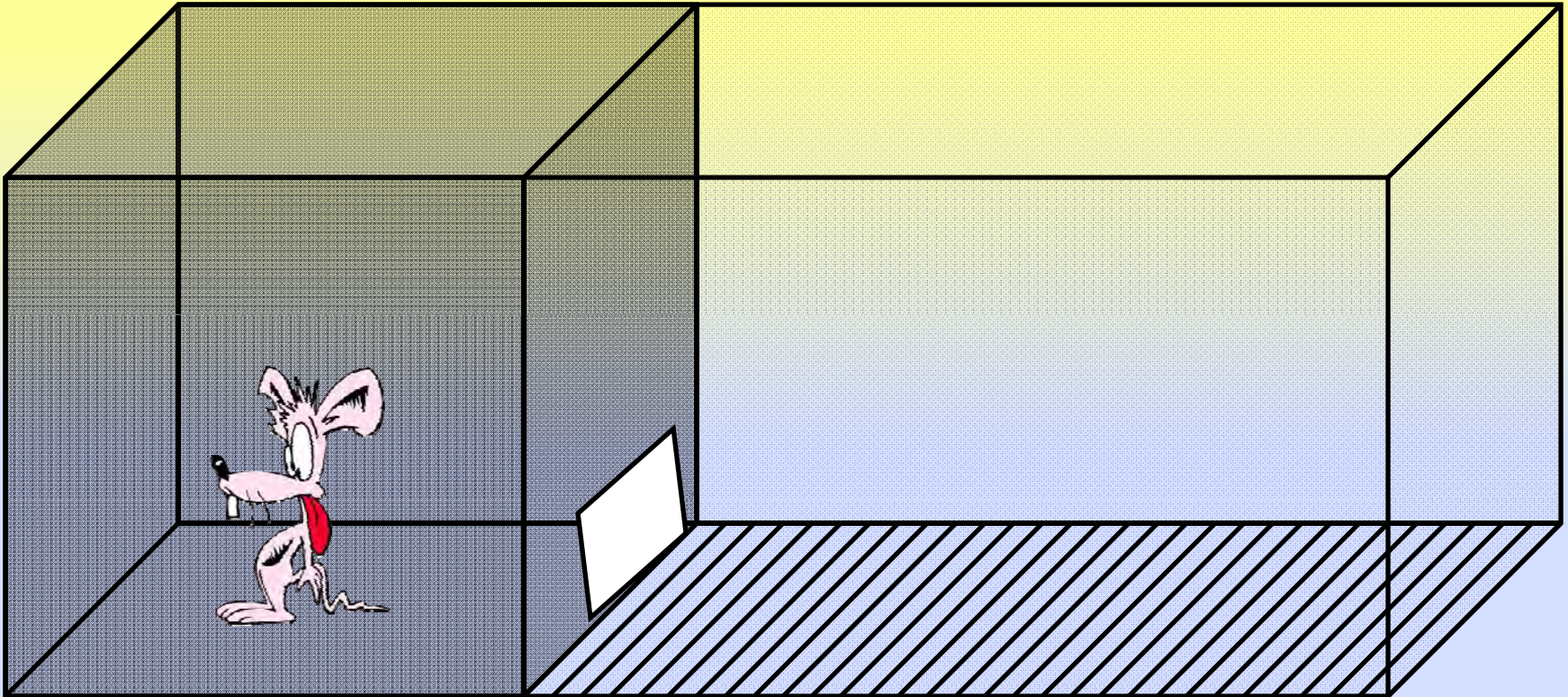
Next trials:
- Unlike the normals, stays at the back for the full 16 seconds.
- Visibly frightened.
- Gets shocked a few more times.
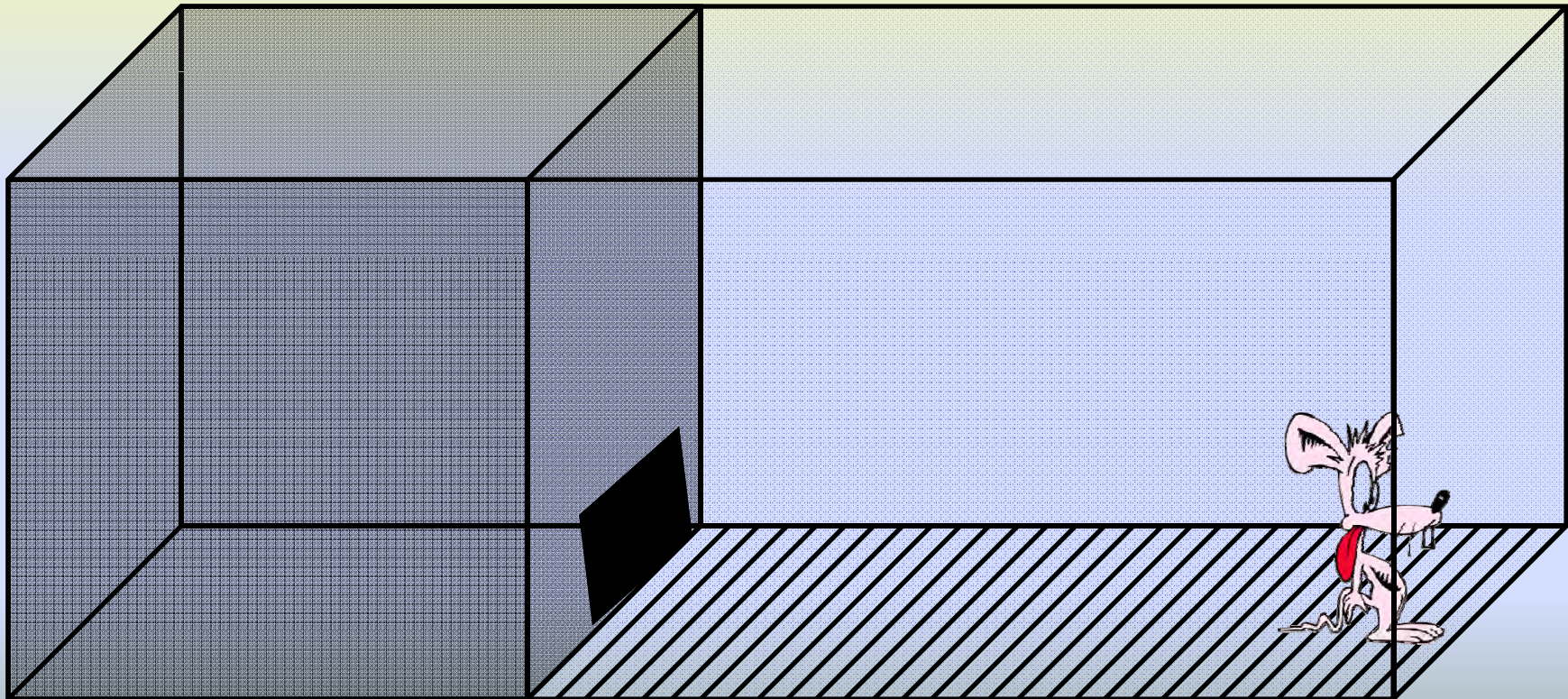
Eventually tries a new strategy.
- Waits 16 seconds.
- Then turns left. Goes to the wall.
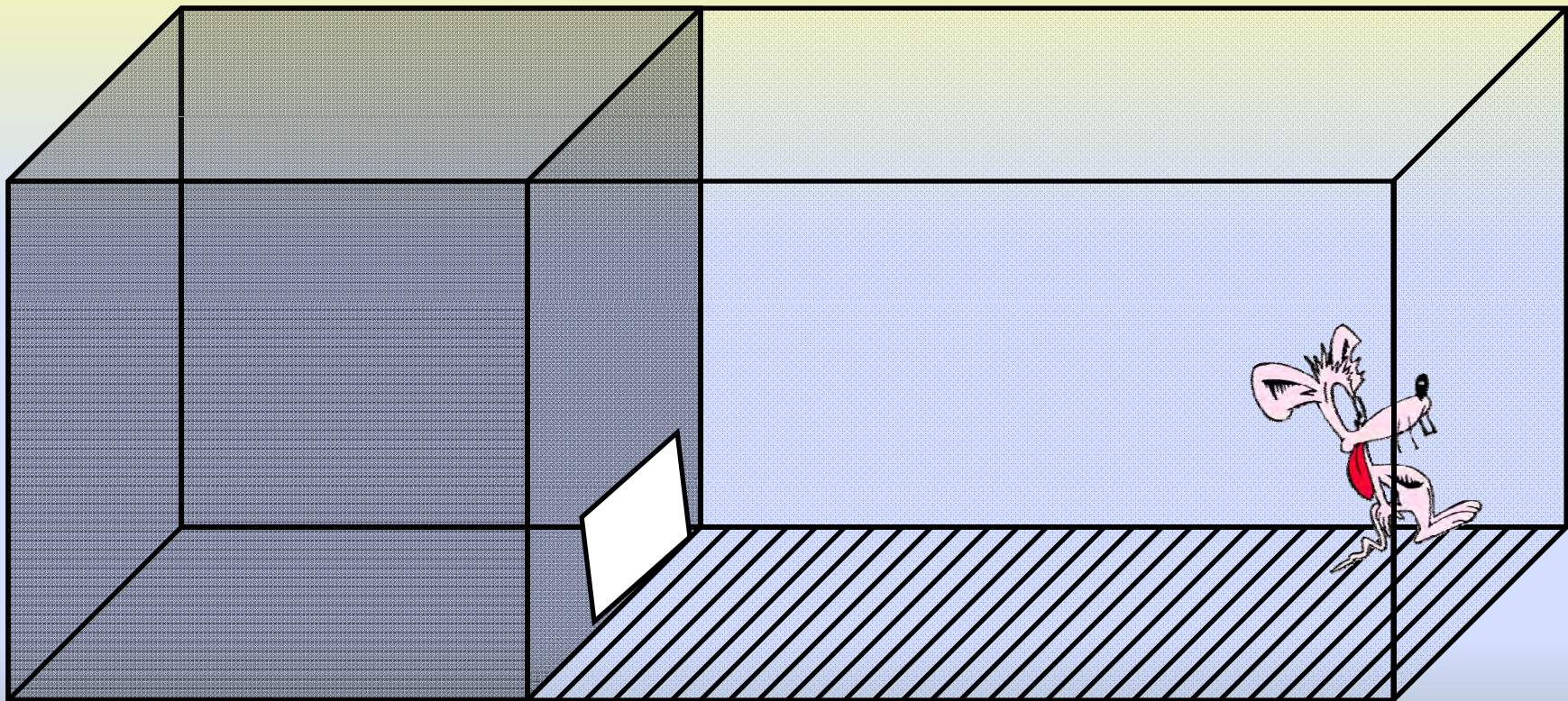
Turns left again
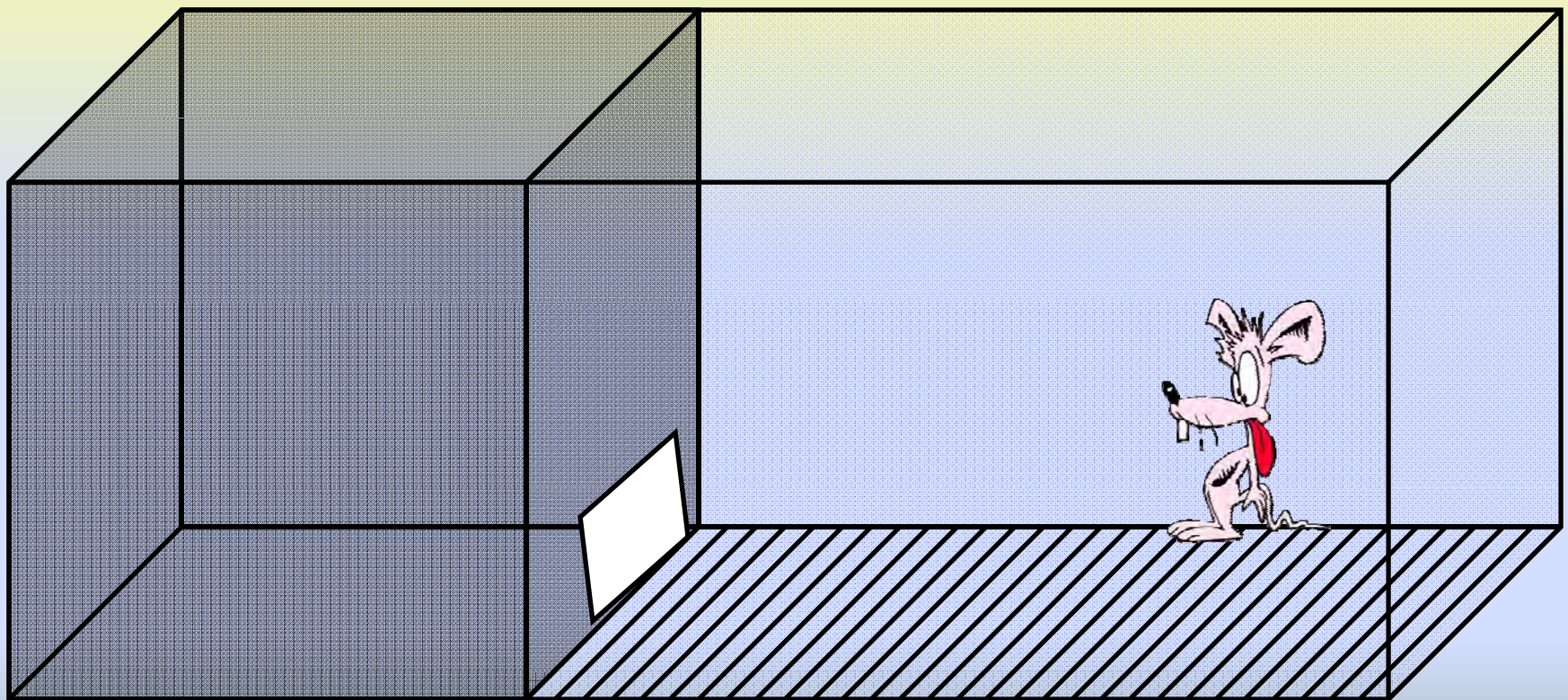
Runs to the wall
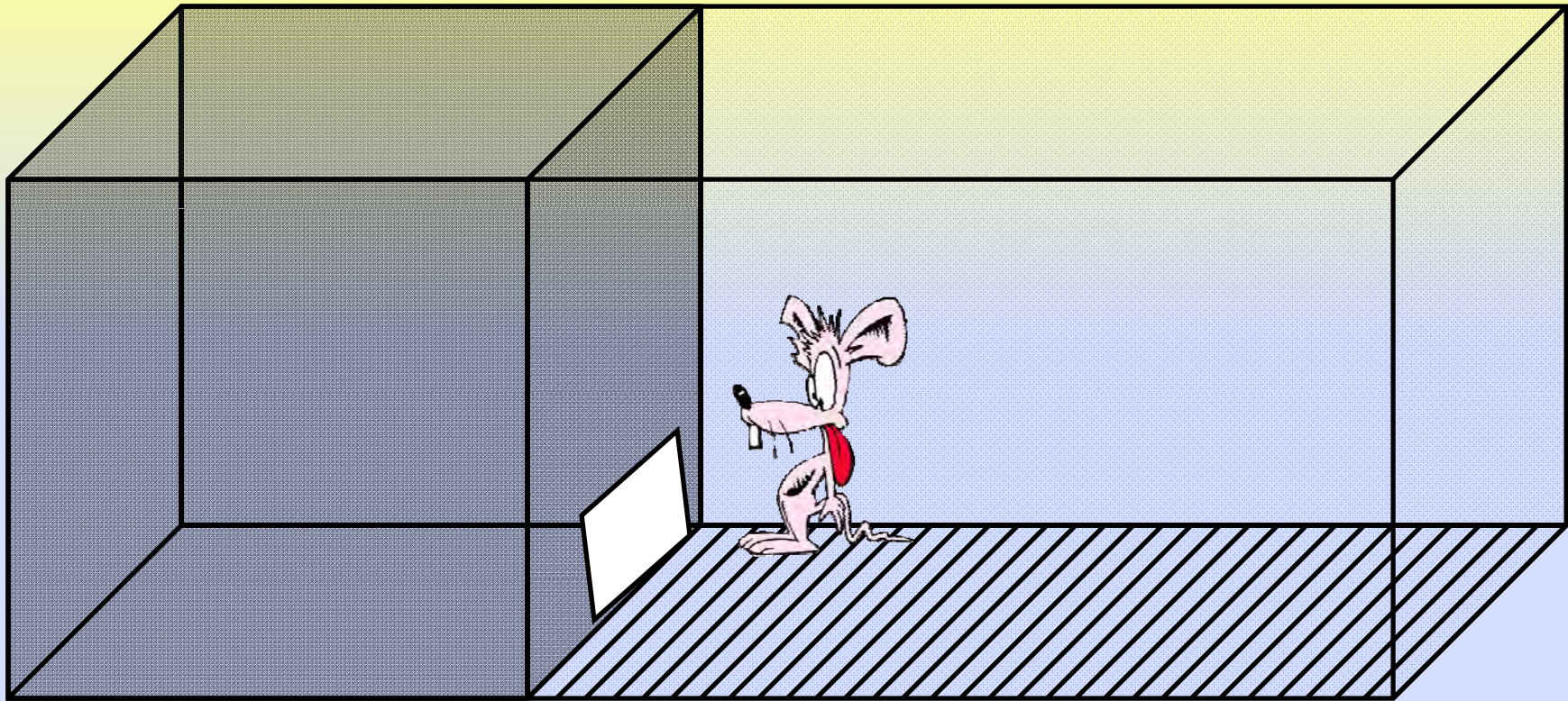
Turns left again.
- Runs to the door.
- And jumps through
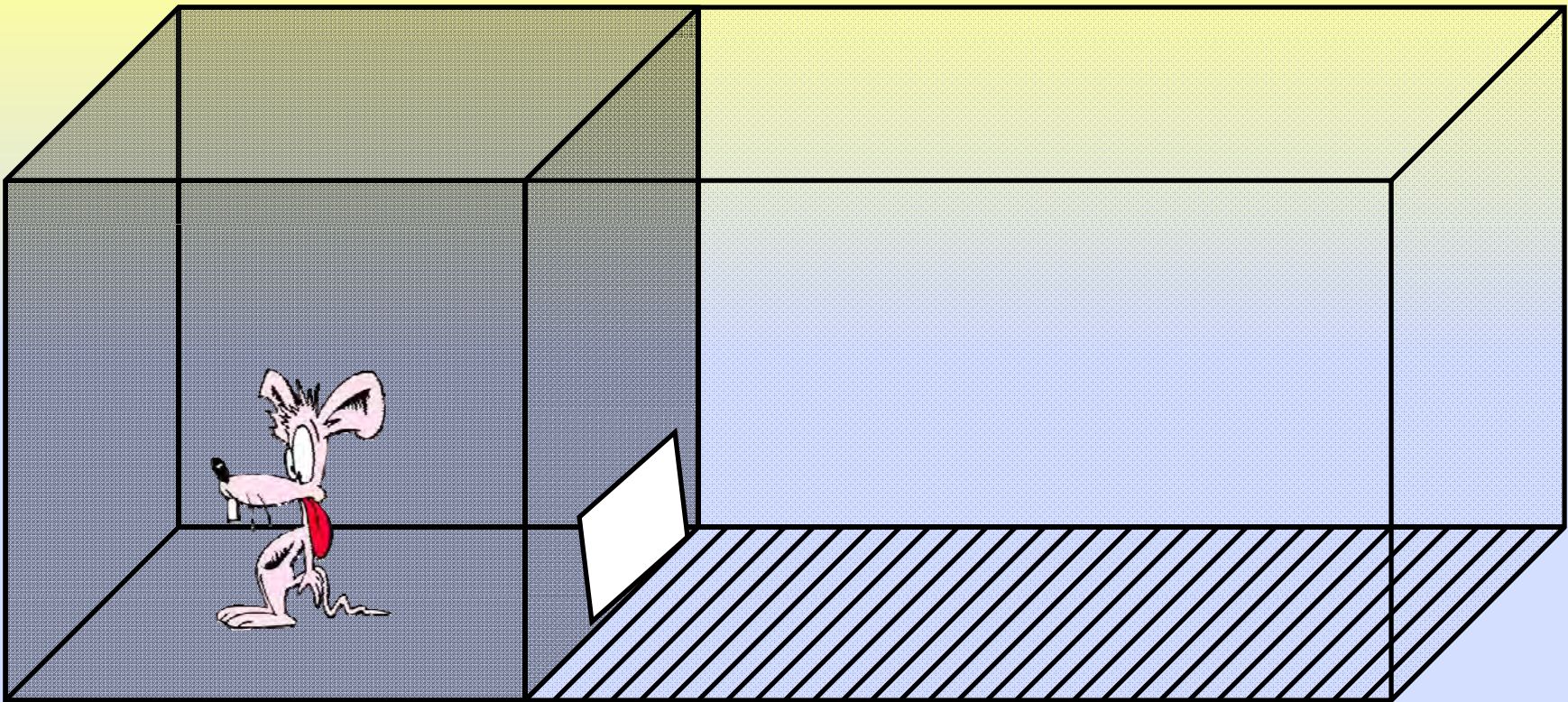
We see the same patterns again and again and again

- The normal rats have a checklist:
  - Find the door to the dark side
  - Go to the door
  - Get through the door to the dark side

- The fornical rats have a script:
  - Wait 16 seconds
  - Turn left, go to the wall
  - Turn left, go to the wall
  - Turn left, go ½ way across cage
  - Turn right, JUMP forward!

Now we get to see the difference between a checklist and a script.

Let's vary the conditions:
- Put the rat at front, facing the door.
- The normal rat stays at the front and tries to get out (pulls on the door, bites the door, etc)
- When the door opens, the rat runs into the dark side.

The normal rats have a checklist:
- Find the door to the dark side
- Go to the door
- Get through the door to the dark side
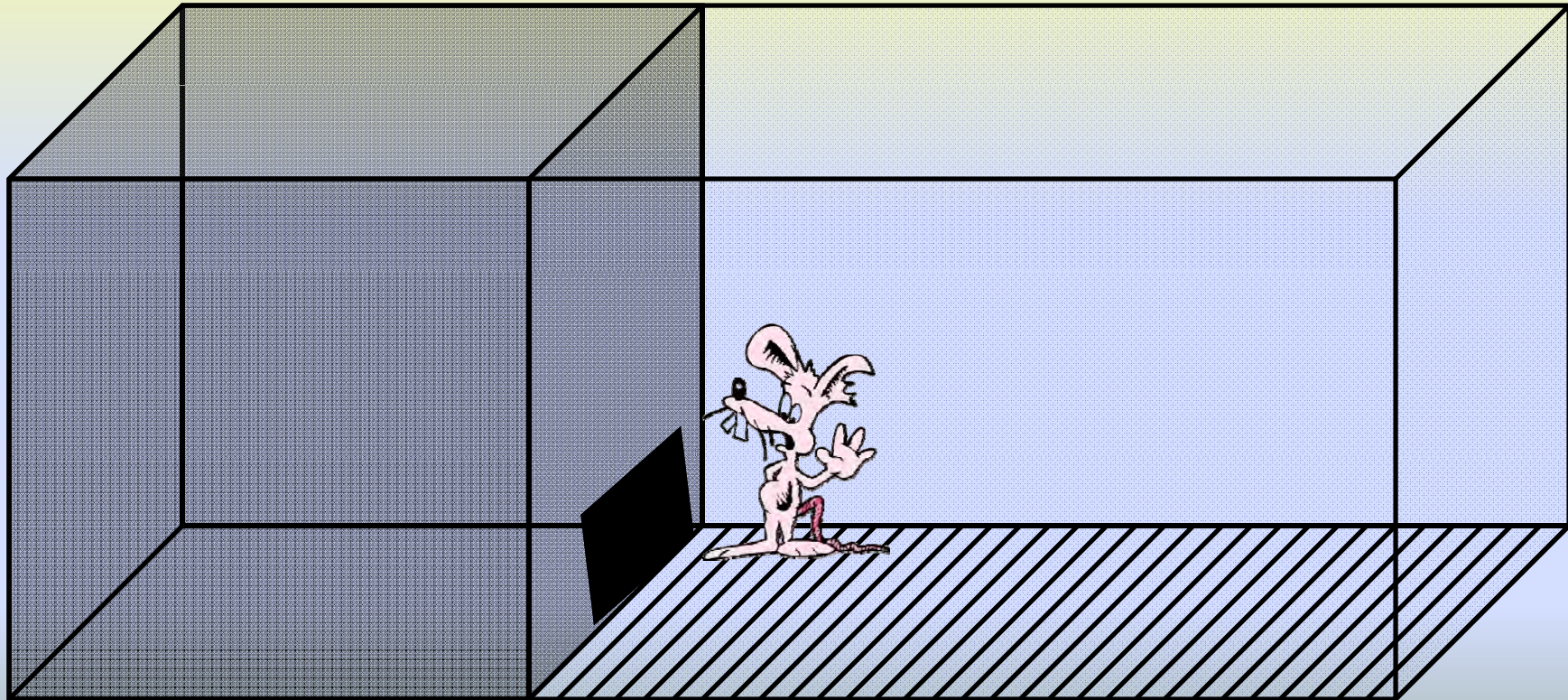
Put the rat at front, facing the door.
- The fornical rat waits at the front for 16 seconds (until the buzzer sounds and the door opens),
- then turns, runs, turns, runs, turns, runs, reaching the back of the box...

The fornical rats have a script:
- Wait 16 seconds
- Turn left, go to the wall
- Turn left, go to the wall
- Turn left, go ½ way across cage

Turn right, JUMP forward!
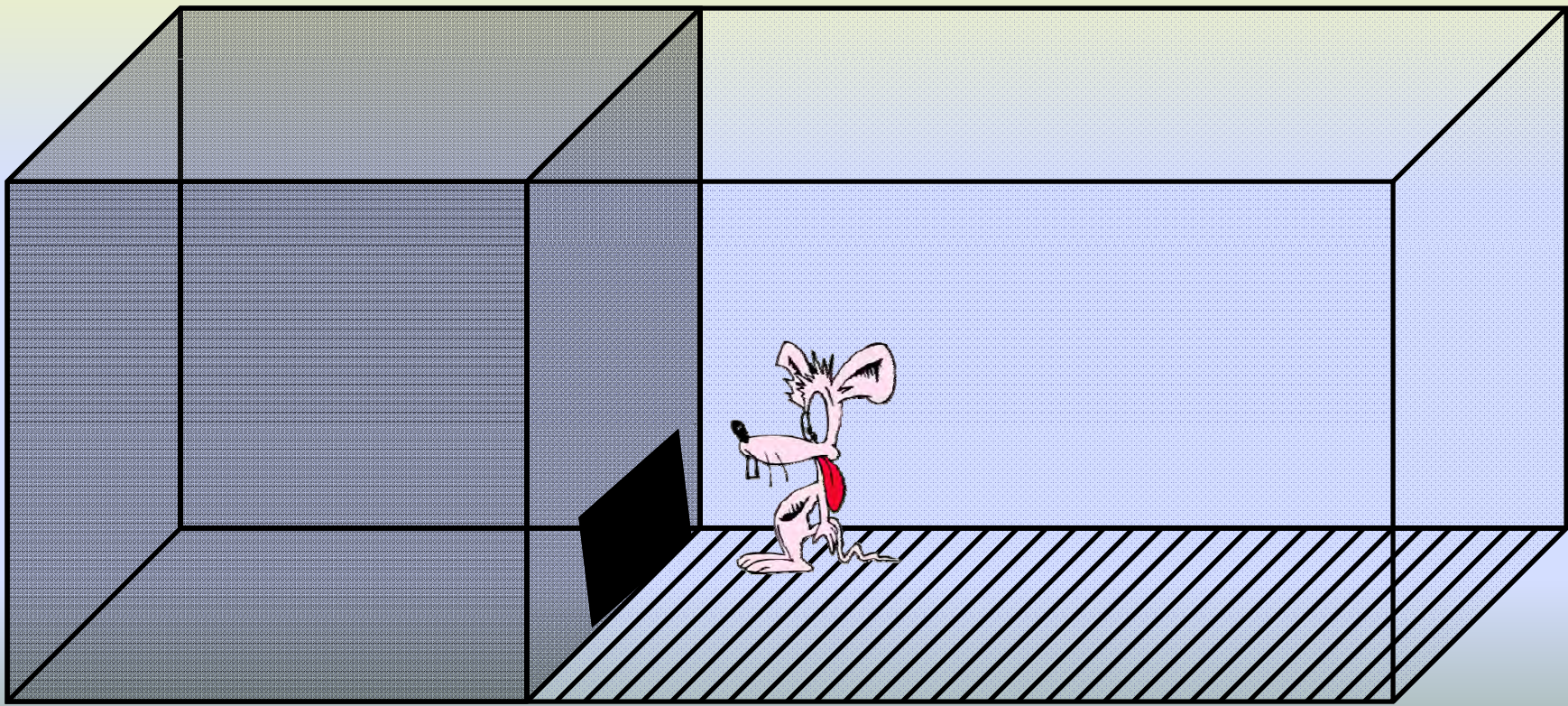
- Several of the fornical rats even JUMPED (as if they were jumping into the dark side).
  - They slammed their nose into the back wall and bounced

The fornical rats have a script:
- Wait 16 seconds
- Turn left, go to the wall
- Turn left, go to the wall
- Turn left, go ½ way across cage

Turn right, JUMP forward!

Ouch!
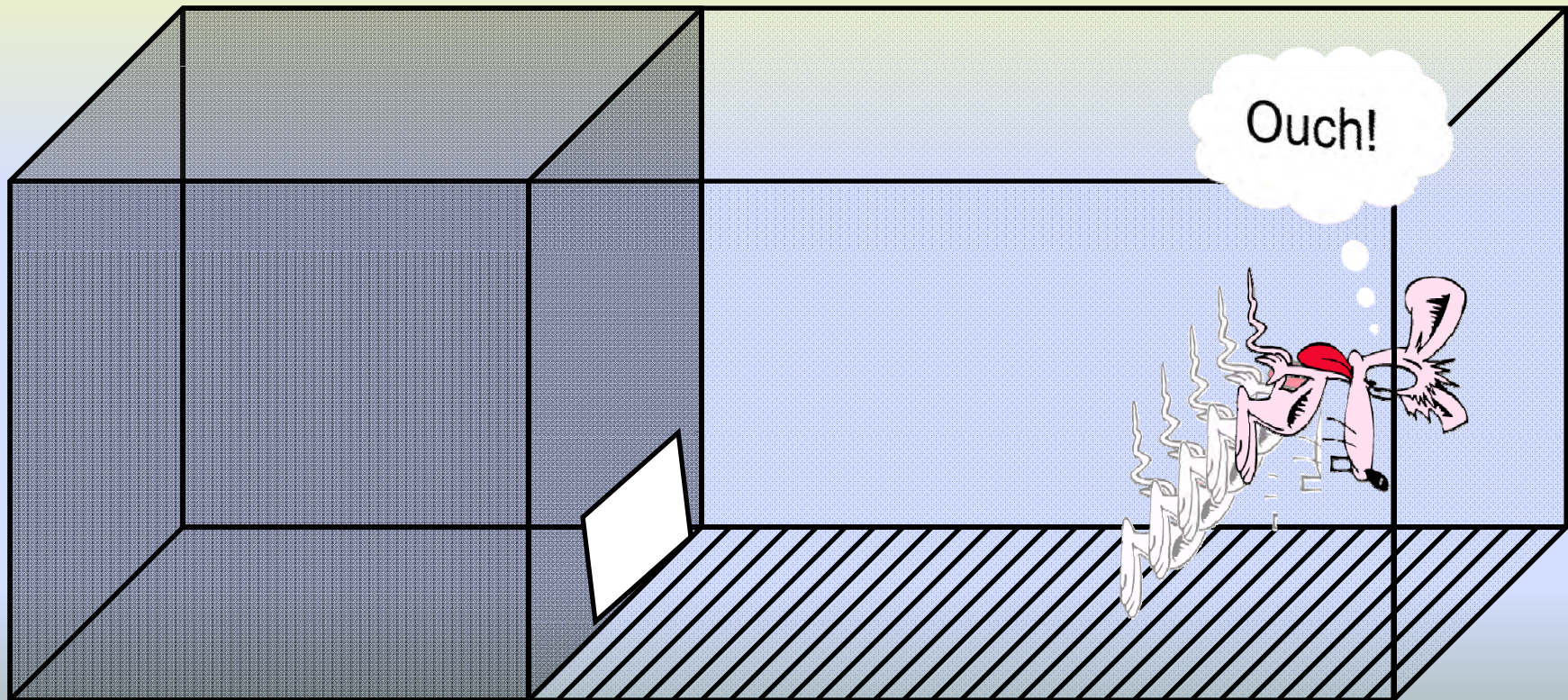
Then they turned left and ran
and turned left and ran
and turned left and ran
and turned right and jumped
into the dark side.

The fornical rats have a script:
- Wait 16 seconds
- Turn left, go to the wall
- Turn left, go to the wall
- Turn left, go ½ way across cage

Turn right, JUMP forward!
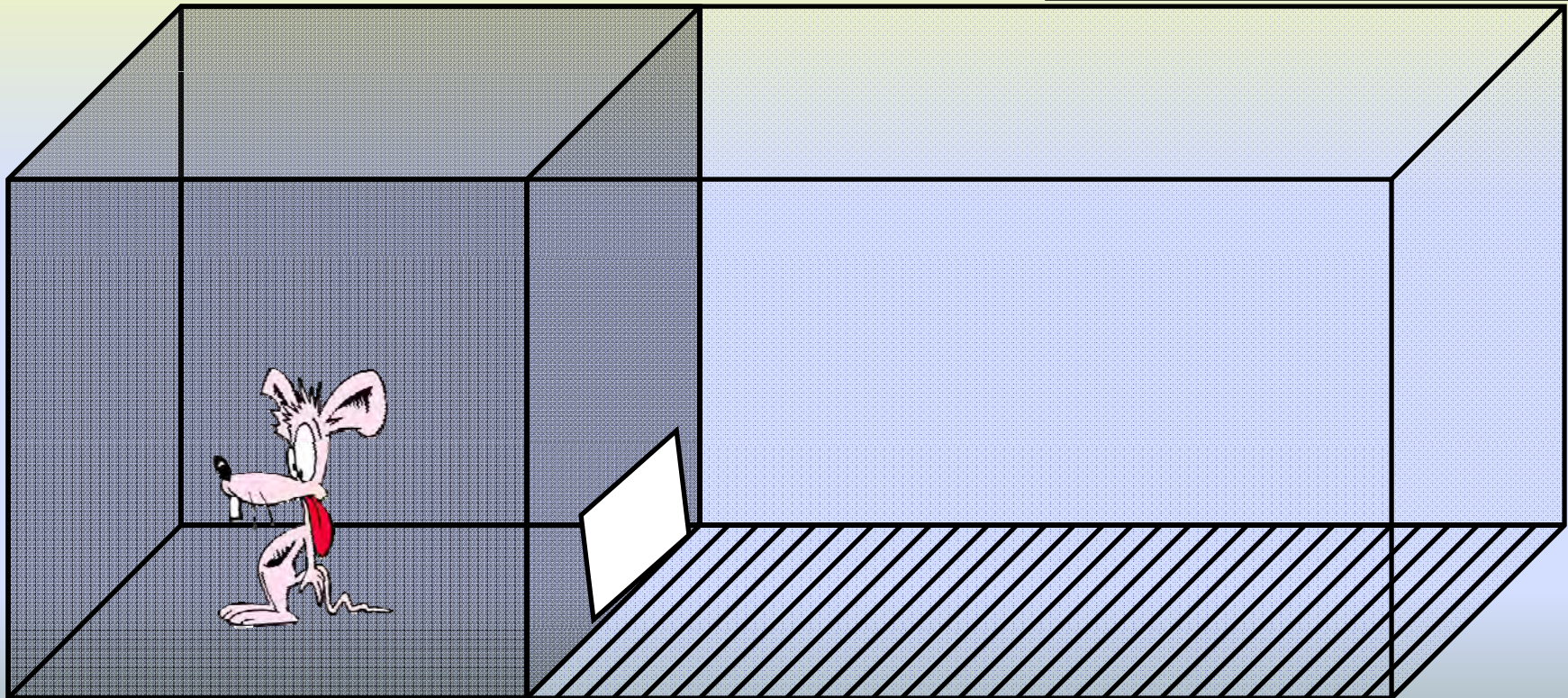
For our next test,
- we started the rat in the dark side,
- facing away from the door,
- waited 16 seconds,
- sounded the buzzer,
- and opened the door.

Guess what the rats did.
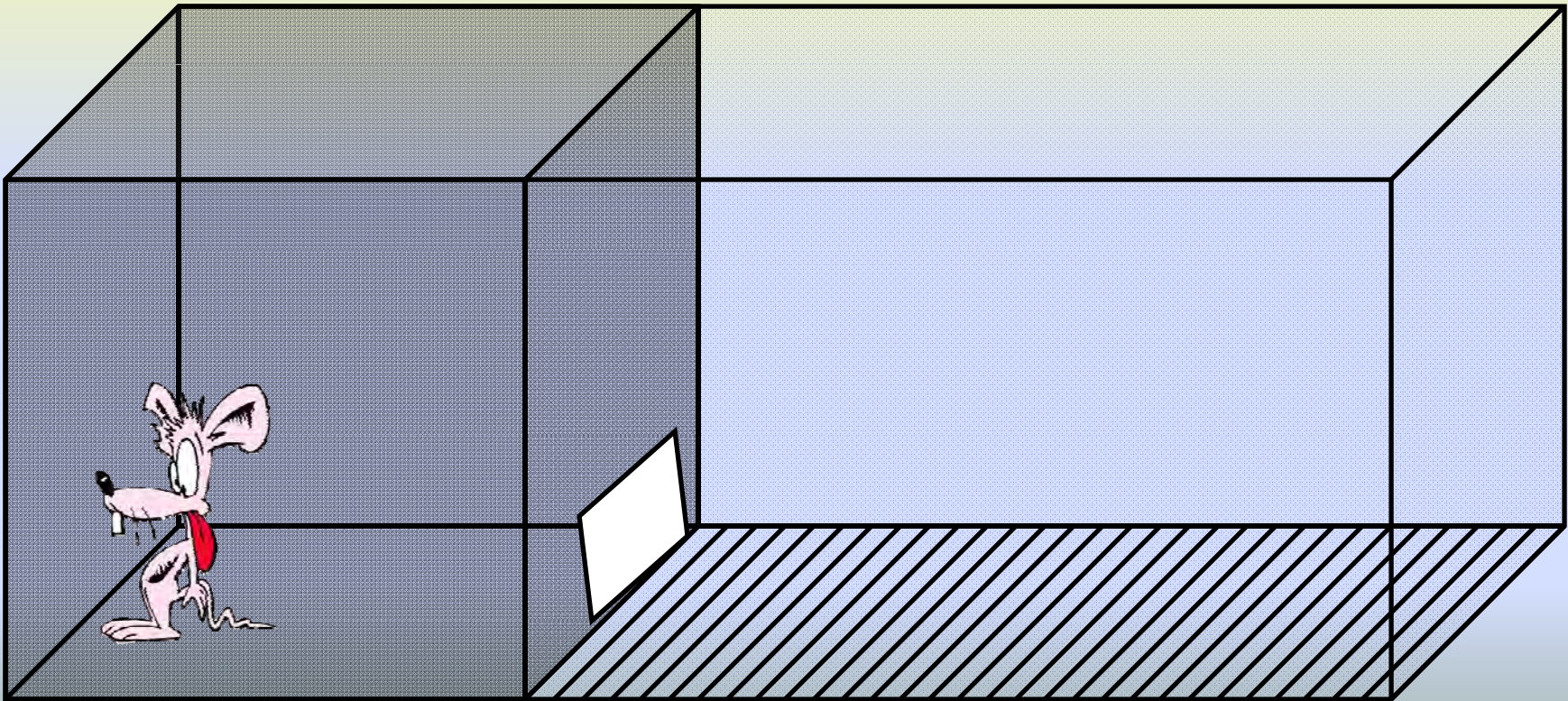
The normal rats have a checklist:
- Find the door to the dark side
- Go to the door
- Get through the door to the dark side

The normal rats stayed on the dark side.
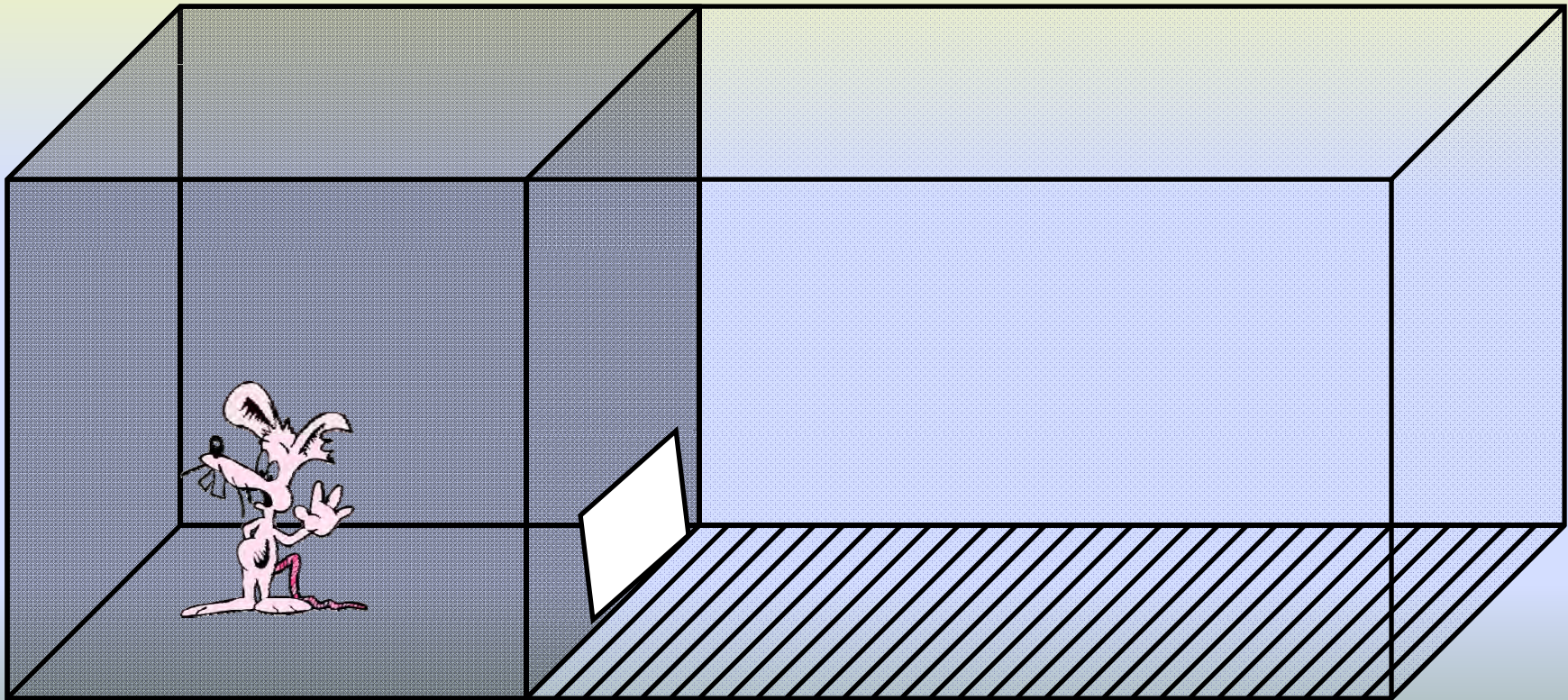
The fornical rats have a script:
- Wait 16 seconds
- Turn left, go to the wall
- Turn left, go to the wall
- Turn left, go ½ way across cage

Turn right, JUMP forward!

The fornical rats followed their script

Ouch!
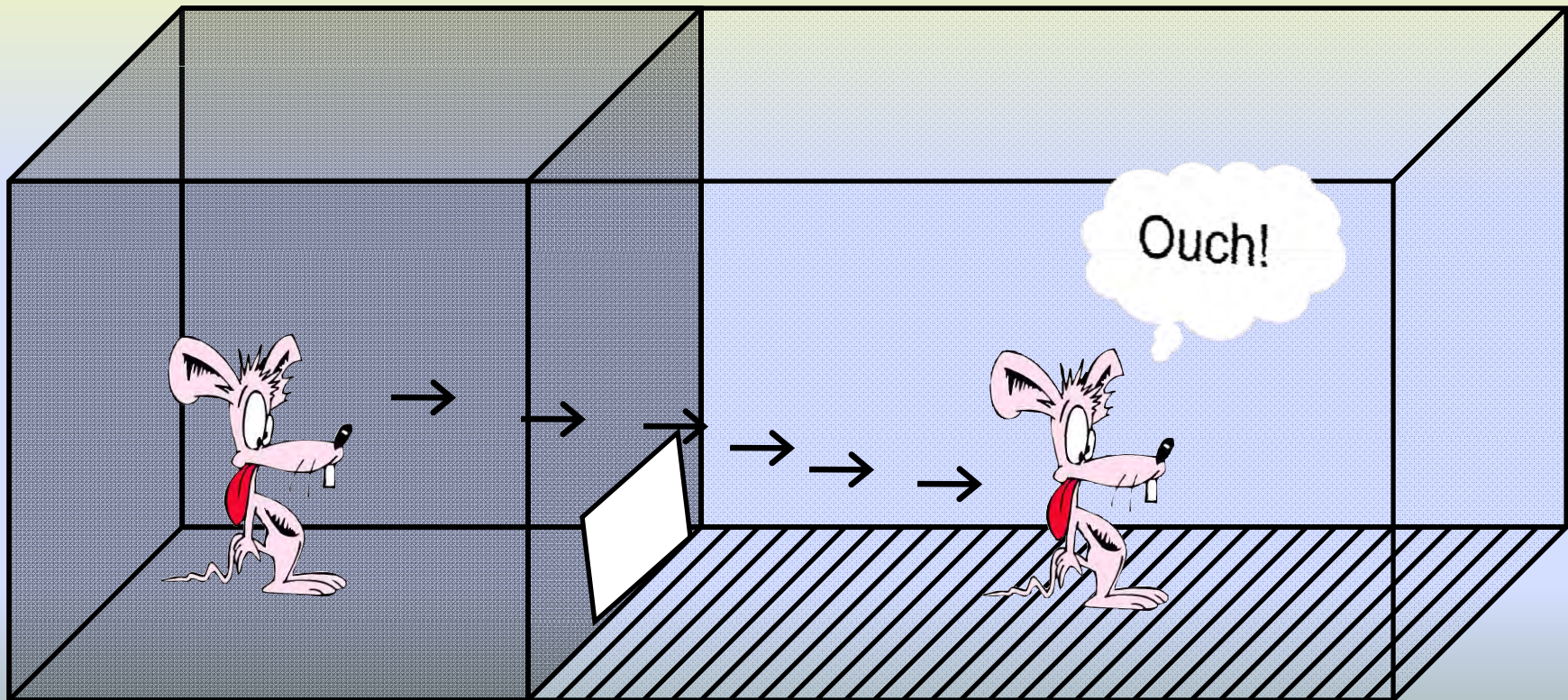
OK, so what have we learned?

It appears that following scripts

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OK, so what have we learned?

It appears that following scripts

is the very "best practice"

available

for

brain-damaged rats

Scripting and learning

A common myth:

A script acts as "training wheels" for the new tester. After several months of following a wide range of scripts, the new tester will have learned by example a lot about:

- the application domain,

- the program, and

- how to test it.

Our application is so complex that we have to give testers scripts or they can't test it.

Scripting and learning

A common myth:

> A script acts as "training wheels" for the new tester. After several months of following a wide range of scripts, the new tester will have learned by example a lot about:
>
> – the application domain,
>
> – the program, and
>
> – how to test it.

Have you ever noticed?

- What happens when you drive to a new place with a navigator who gives you a script: "turn left next light" etc.?

- If you try to go there again, do you remember the route?

No, learning support is NOT a benefit of scripts

Claims that following scripts will help you learn about the software or how to test it incompatible with our knowledge of instructional design and learning theory. TRANSFER: can you apply what you learn to another course or to real practice?
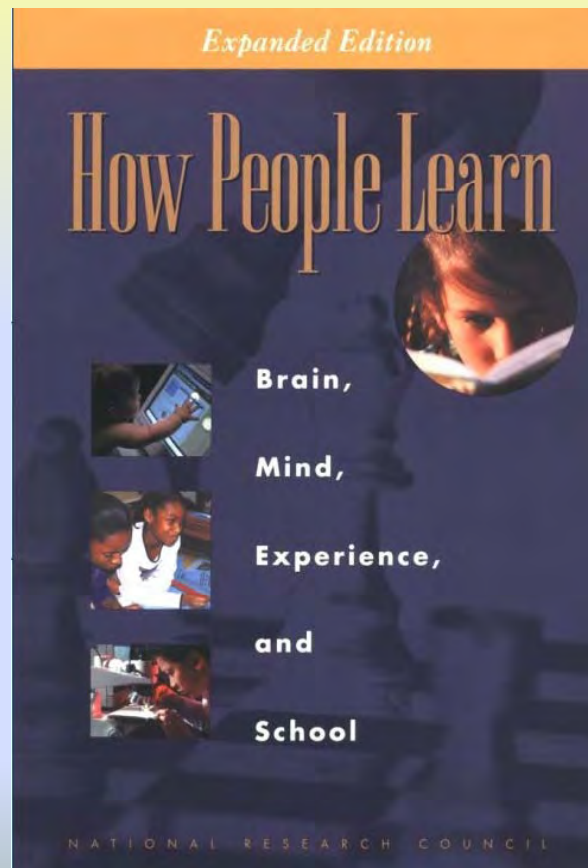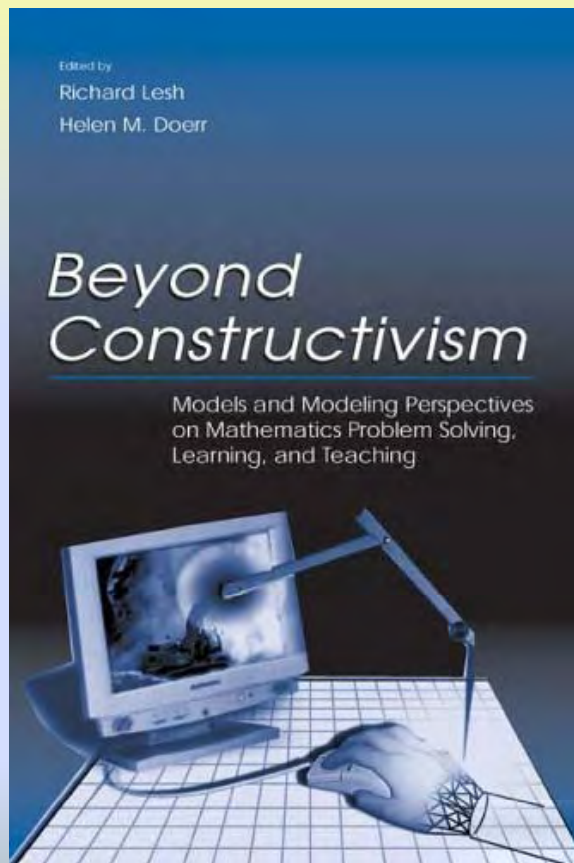
- In science / math education, the transfer problem is driving fundamental change in the classroom

- Students learn (and transfer) better when they discover concepts, rather than by being told them

Scripts: Poor tools for adult learning

- **Pedagogy**: study of teaching / learning of children
- **Andragogy**: study of teaching / learning of adults
- University undergrads are in a middle ground between the teacher-directed child and the fully-self-directed adult
- Both groups, but especially adults, benefit from activity-based and discovery-based styles

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Elwood F. Holton III
Richard A. Swanson

Sixth Edition 6

The Adult Learner

The Definitive Classic in Adult Education and Human Resource Development

Scripted testing

A script specifies

- **test entry conditions**

- test operations

- expected results

- comparisons the human or machine should make

Scripts can control

- manual testing by humans

- automated test execution or comparison by machine

No, scripts do not <u>fully</u> specify entry conditions
Based on notes from Doug Hoffman

Program state

System state

Intended inputs

Configuration and system resources

From other cooperating processes, clients or servers

System under test

Program state, including uninspected outputs

System state

Monitored outputs

Impacts on connected devices / system resources

To other cooperating processes, clients or servers

For example, *can you* specify your test configuration?

- Does your test documentation specify ALL of the processes running on your computer?

- Does it specify what version of each one?

- Do you even know how to tell
  - What version of each of these you are running?
  - When you (or your system) last updated each one?
  - Whether there is a later update?

Scripted testing

A script specifies

- test entry conditions
- test operations
- **expected results**
- comparisons the human or machine should make

Scripts can control

- manual testing by humans
- automated test execution or comparison by machine

Scripts cannot specify all possible outcomes
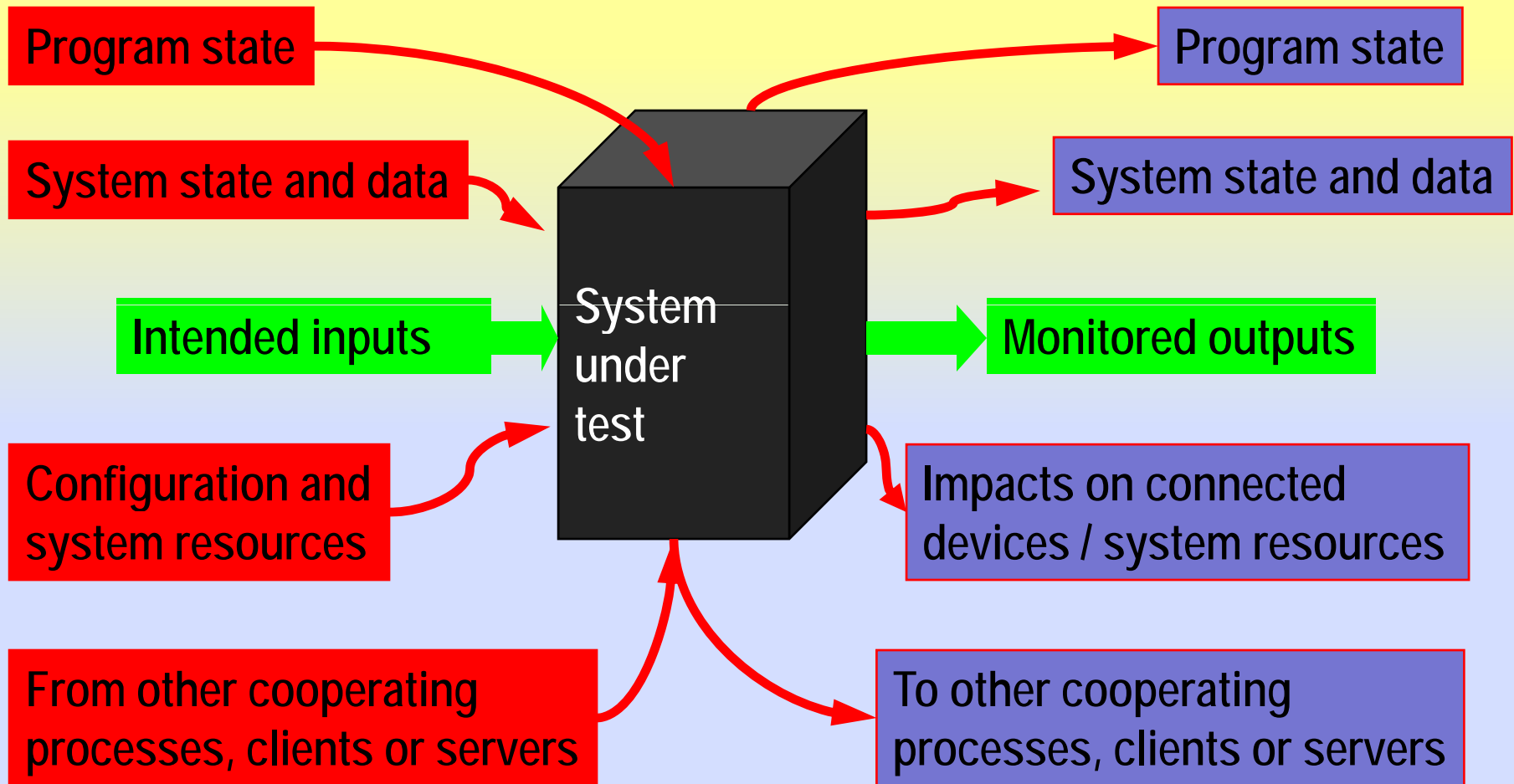
Program state → System under test → Program state

System state and data → System under test → System state and data

Intended inputs → System under test → Monitored outputs

Configuration and system resources → System under test → Impacts on connected devices / system resources

From other cooperating processes, clients or servers → System under test → To other cooperating processes, clients or servers

Based on notes from Doug Hoffman

Our tests cannot address all the possibilities

People are finite capacity information processors

- We pay attention to some things

  - and therefore we do NOT pay attention to others

  - Even events that "should be" obvious will be missed if we are attending to other things.

This is often the cause of irreproducible failures. We paid attention to the wrong conditions.

- But we can't pay attention to all the conditions

The 1100 embedded diagnostics

- Even if we coded checks for each of these, the side effects (data, resources, and timing) would provide us a new context for the Heisenberg principle

Automated tests notice only what they are programmed to look at:

- They are blind to everything else, by design

Scripted testing
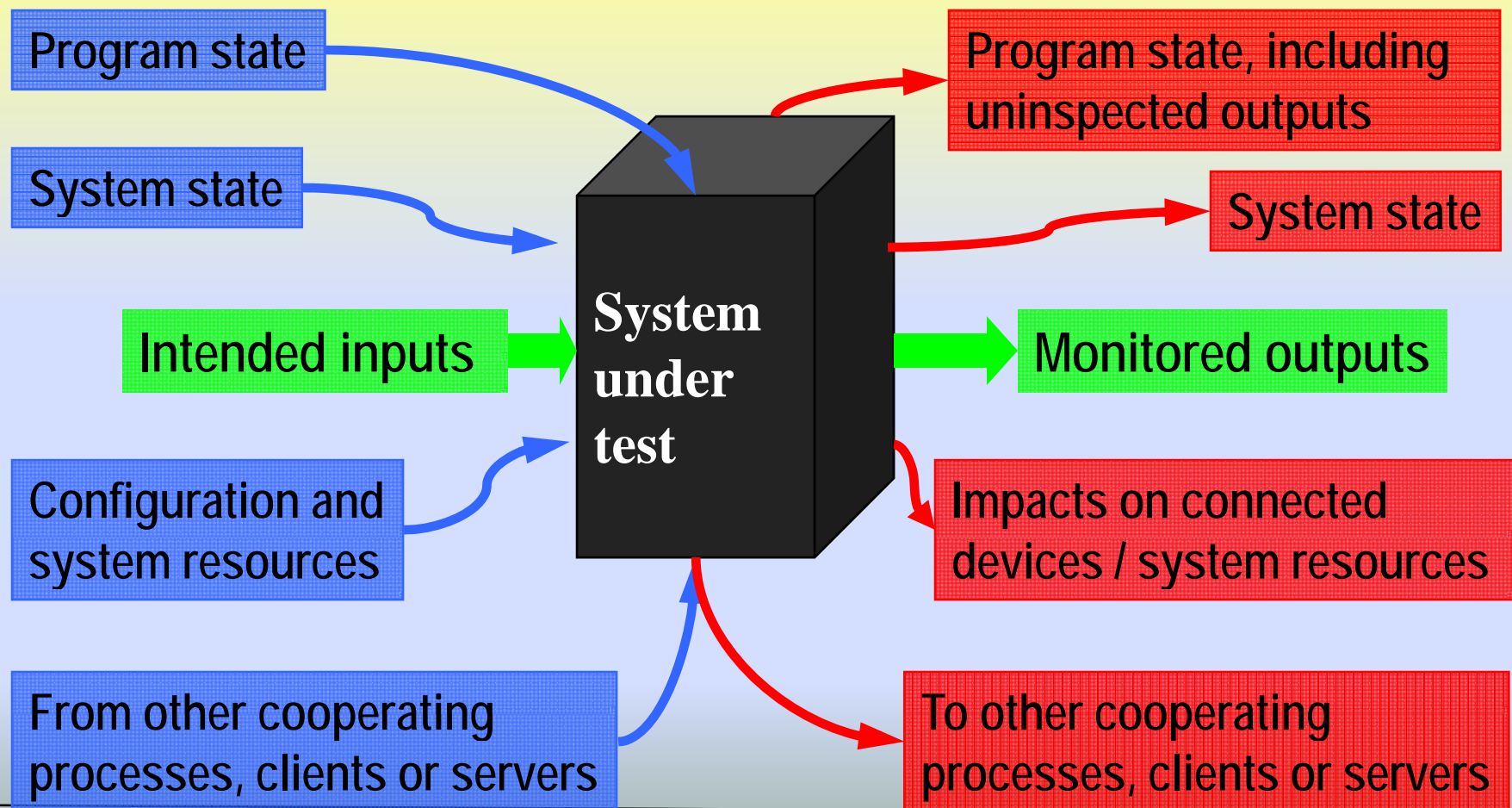
A script specifies

- test entry conditions

- test operations

- **expected results**

- **comparisons the human or machine should make**

Scripts can control

- manual testing by humans

- automated test execution or comparison by machine

Selective processing / biases

- Obama versus Clinton versus McCain

- Dartmouth / Princeton football demonstration

  - Hastorf, A. H. & Cantril, H. (1954). They saw a game: A case study. *Journal of Abnormal and Social Psychology*, 49, 129-134.

  - Smoker / Nonsmoker studies of confirmation bias

  - http://en.wikipedia.org/wiki/Confirmation_bias

- People will interpret what they see consistently with what they expect / want

  - Expected results drive expectancies

- If you set testers to believe they will find failures, they will find more failures and miss fewer ones
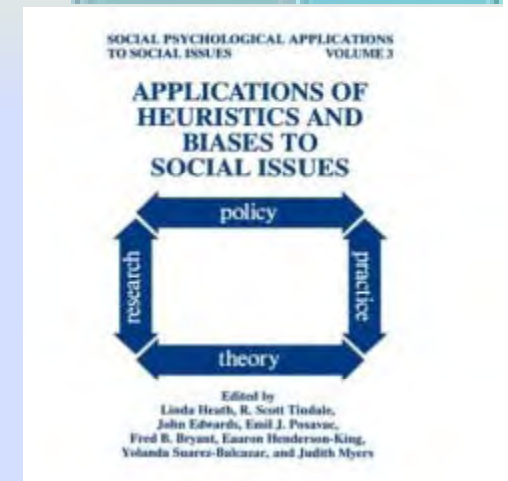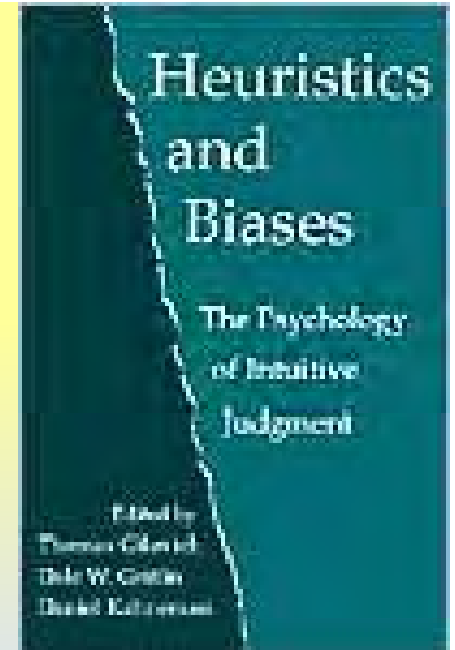
Inattentional blindness:

If you haven't seen a demonstration of this, we can do it in open season

- http://www.geekarmy.com/Science/Crazy-Vision-Test.html
- http://www.dothetest.co.uk/
- http://viscog.beckman.uiuc.edu/djs_lab/demos.html
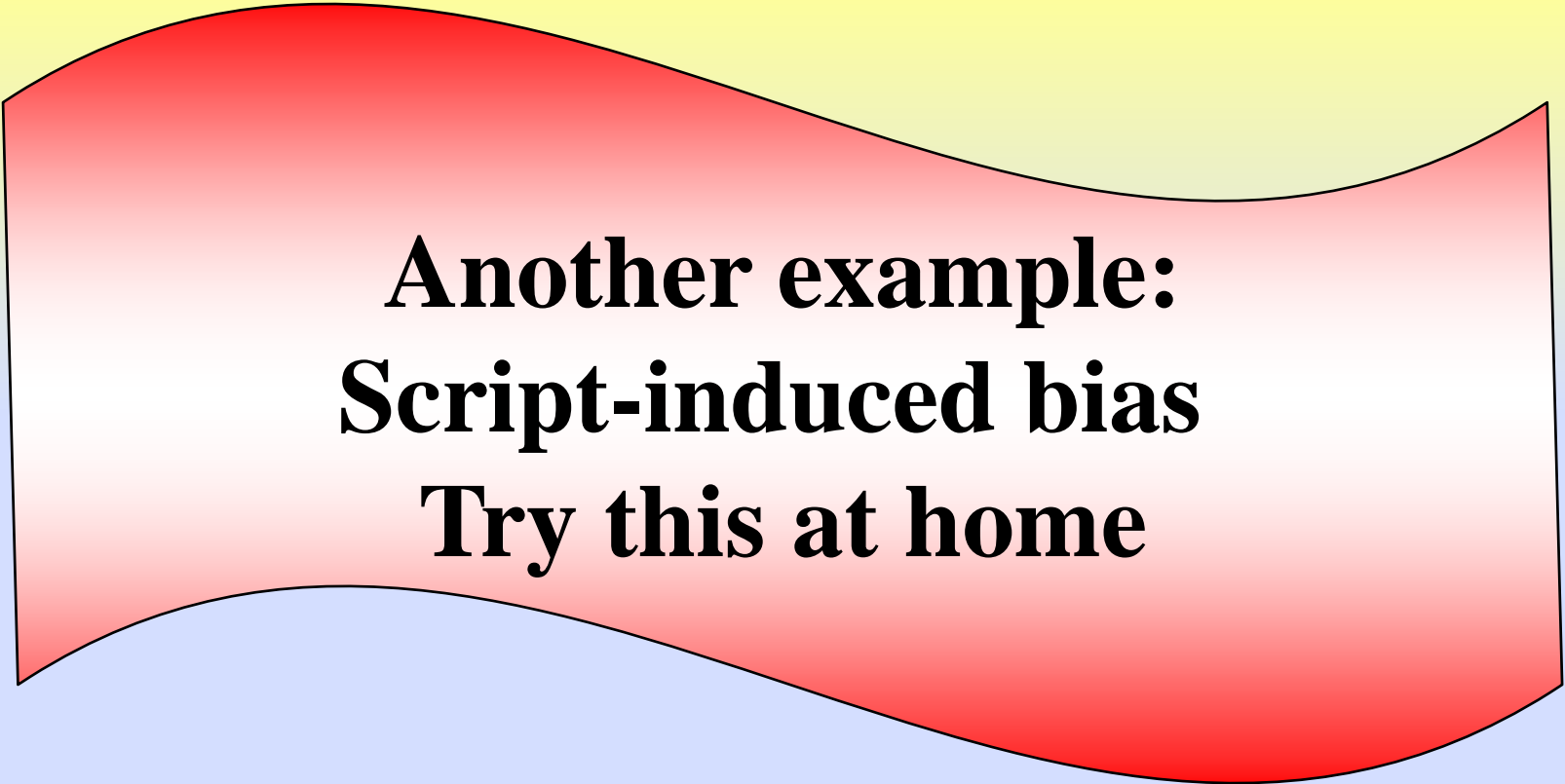
Inattentional blindness

- What is important about inattentional blindness is NOT
  - Selective attention
    - ° (we've known about that for years and years and years)
- It is that IB demonstrates:

pre-attentive semantically-based filtering

(we ignore things based on their meaning, before we ever become aware of them).

Inattentional Blindness

Arien Mack and Irvin Rock
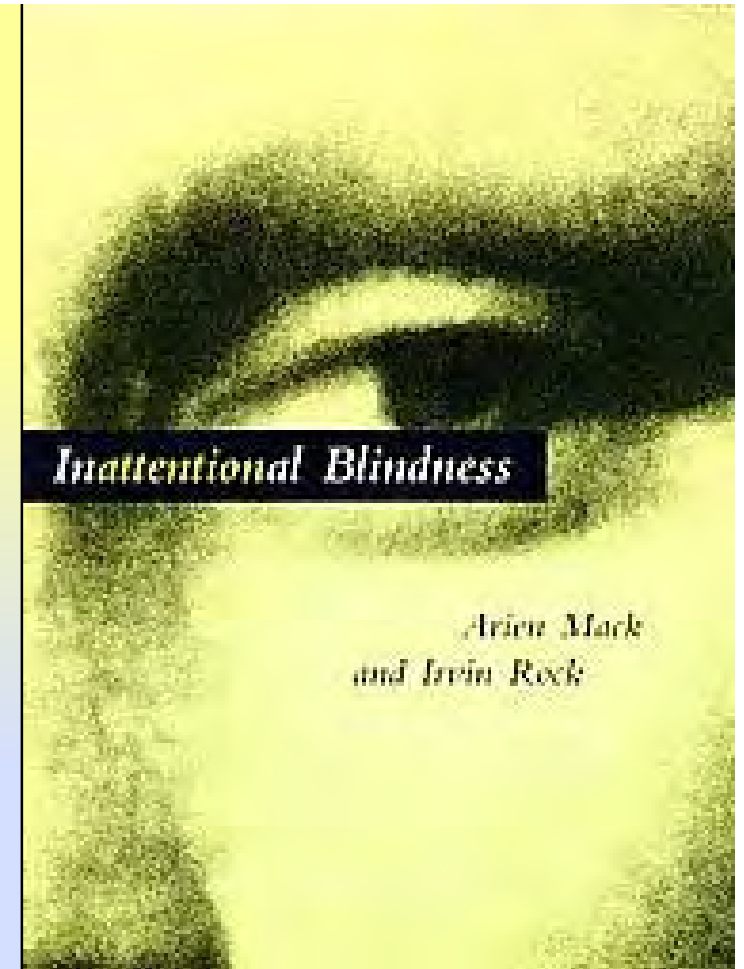
Another example: Script-induced bias
Try this at home

A simple arithmetic exercise

Problem	We have a vat of marbles and three jars, with the following capacities			Obtain this many marbles
	Jar A	Jar B	Jar C	
1	21	127	3	100

You can pour marbles from one jar to another. For example, if you fill Jar B (127 marbles), you can fill Jar A from Jar B and have 127-21=106 marbles left in Jar B.

You can fill and empty any jar as many times as you want.

How could you get 100 marbles?

Arithmetic exercise

Problem	We have a vat of marbles and three jars, with the following capacities			Obtain this many marbles
	Jar A	Jar B	Jar C	
1	21	127	3	100
2	14	163	25	99

Please try these as a paper/pencil exercise. Actually solve each one before flipping to the next slide.

Arithmetic exercise

Problem	We have a vat of marbles and three jars, with the following capacities			Obtain this many marbles
	Jar A	Jar B	Jar C	
1	21	127	3	100
2	14	163	25	99
3	9	142	6	121

Please don't go to the next slide until you know how to get 121 marbles, working only with Jars A (holds 9 marbles), B (142 marbles) and C (6 marbles).

Arithmetic exercise

Problem	We have a vat of marbles and three jars, with the following capacities			Obtain this many marbles
	Jar A	Jar B	Jar C	
1	21	127	3	100
2	14	163	25	99
3	9	142	6	121
4	18	43	10	5

Arithmetic exercise

Problem	We have a vat of marbles and three jars, with the following capacities			Obtain this many marbles
	Jar A	Jar B	Jar C	
1	21	127	3	100
2	14	163	25	99
3	9	142	6	121
4	18	43	10	5
5	23	49	3	20

Arithmetic Exercise

- When people do this as a paper/pencil exercise, they see a pattern:
  - Fill Jar B, dump from B into A, then dump from B into C twice
    - 127 - 21 - 3 - 3 = 100
    - 163 - 14 - 25 - 25 = 99

- And then they apply the pattern to a problem that can be solved much more simply without it:
  - Yes, 49 - 23 - 3 - 3 = 20
  - **but so is 23 - 3 = 20**

- People get so caught up in following the pattern (the script) that they no longer analyze the problem, and so a solution that would otherwise be completely obvious becomes invisible.

Back to our regularly Scheduled lecture..

Procedural checklists versus scripts

- I first saw this ambiguity at WordStar (1984):
  - we created (what we intended to be) test scripts
  - we gave the same scripts to two small groups who worked independently
    - ° tech support staff, who actually followed the scripts
    - ° testers, who agreed to follow the scripts but did follow-ups, variations on the theme, troubleshooting, lots of tests off the scripts.
  - the testers found 3.5 times as many bugs.
- We stopped the experiment, and I've never tried to replicate this with larger numbers (I'm open to collaborating with someone...), but I trust the direction (if maybe not the size) of the effect

An example of a checklist

What is "reckless driving?"

- Many states, 3 moving violations within a few minutes is sufficient evidence

- California, conviction for "reckless driving" requires proof of "recklessness" (accept or ignore obvious risk that your conduct will injure someone)

- Police in CA often arrested for reckless driving & focused their arrest report on moving violations:
  - result = not guilty.

I created a multidimensional checklist for guiding collection of evidence.

The Driver		
Driver's comments about her/his driving to police	Intoxicated -- decided to drive before getting drunk	Previous drunk driving convictions
Driver's reason for fleeing from police . . .	Intoxicated -- decided to drive after getting drunk	Previous drunk driver education courses
Driver's comments to passengers or witnesses	Intoxicated -- unconscious or can't appreciate risks	Previous alcohol treatment
Passengers complained to driver about driving	Knowledge of warnings associated with medication	Previous accidents involving risky driving
Friends/family told driver not to drive	Knowledge of the neighbourhood	Previous tickets involving risky driving
Played chicken	Not looking at the road	Previous driver education courses
Honking or rude gestures to other drivers	Not wearing necessary glasses or contacts	Recent near-accidents
Anger or emotional experience that day	Speeding into the sun without sunglasses	Previous daredevil history
Attempting to rescue someone	Played music too loud to hear anything	Previous convictions for dangerous crimes
Known mechanical problem (e.g. bad brakes)	Special susceptibility (e.g. narcolepsy, epilepsy)	Knowledge of previous accidents at this location

The Driving		
Hit and run	Cut sharply across path of a heavy vehicle	Drove between lanes
Deliberately hit or bumped another car	Cut off an emergency vehicle with sirens	Passed on shoulder or center divider
Extreme tailgating	Passed cars extremely closely	Drove on wrong side of the road
Fleeing from police	Passed through path of a turning vehicle	Drove on curb or sidewalk
Evasive maneuvers	Passed on the right and the left	Abruptly stopped in intersection
Abrupt U-turn	Rapid lane changes	Weaved/drifted from lane to lane or over center line
Sudden exit from freeway	Ran stop signs or red lights	Ran into concrete divider, tree, etc.
Exceptional speed under the circumstances	Took turns without slowing down	Took curve too fast (spun or lost control)
Speed contest	Fishtailed when driving or braking	Took curve too fast (went into another lane)
Exhibition of speed	Straddled lanes to keep another car from passing	Vehicle became airborne

Reactions of Other Drivers and Witnesses		
Forced another vehicle to tap brake lights	Forced other vehicle off the road	Forced other vehicle to stop suddenly
Forced an emergency vehicle running with lights and sirens to tap its brakes	Drove so unexpectedly that other driver made a point of watching car's further progress	Eyewitnesses spontaneously exclaimed about recklessness of the driving

Environmental Conditions		
Dark, or twilight	Narrow road	Residential area
Sun low, in drivers' eyes	Gravel or dirt road	Marked senior citizen, blind, school, or deaf zone
Raining	Gravel median or shoulder	Deer or horse crossing
Ice on the road	Oil on the road	Extensive parking in the middle of the road
Foggy	Flares in the road	Visible construction in progress
Unusually noisy	Bike lanes	Accident or other distraction on the road
Fireworks or other off-road distractions		Black marks on the road or divider

Reckless driving checklist -- 1. The driver

Arresting officer's (or witnesses') observations of driver's behavior or state

- Example: driver brags about "getting even" with a rude driver
- Example: passenger says, "I told him he was going to cause an accident!"
- Counter-example: rushing to hospital with injured person

The Driver		
Driver's comments about her/his driving to police	Intoxicated -- decided to drive before getting drunk	Previous drunk driving convictions
Driver's reason for fleeing from police . . .	Intoxicated -- decided to drive after getting drunk	Previous drunk driver education courses
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Attempting to rescue someone	Played music too loud to hear anything	Previous convictions for dangerous crimes
Known mechanical problem (e.g. bad brakes)	Special susceptibility (e.g. narcolepsy, epilepsy)	Knowledge of previous accidents at this location

Reckless driving checklist -- 2. The driving

Arresting officer's (or witness) observations of the driving. Do specific details of the driving suggest a reckless state of mind?

- Example: Cut sharply across path of loaded, big truck

The Driving		
Hit and run	Cut sharply across path of a heavy vehicle	Drove between lanes
Deliberately hit or bumped another car	Cut off an emergency vehicle with sirens	Passed on shoulder or center divider
Extreme tailgating	Passed cars extremely closely	Drove on wrong side of the road
Fleeing from police	Passed through path of a turning vehicle	Drove on curb or sidewalk
Evasive maneuvers	Passed on the right and the left	Abruptly stopped in intersection
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Exhibition of speed	Straddled lanes to keep another car from passing	Vehicle became airborne

Reckless driving checklist --

3. Reactions of Other Drivers & Witnesses

Officer's observations of the behavior of other drivers (or of other people watching the driving)

- Example: **The driver** cuts sharply across path of big truck. **The truck** sharply breaks (to avoid collision with driver), swerves, and flips.

- Example: **The driver** tailgates and bumps the car ahead. **The other driver** calls 9-1-1 (police) in panic about the crazy driver behind him.

Reactions of Other Drivers and Witnesses		
Forced another vehicle to tap brake lights	Forced other vehicle off the road	Forced other vehicle to stop suddenly
Forced an emergency vehicle running with lights and sirens to tap its brakes	Drove so unexpectedly that other driver made a point of watching car's further progress	Eyewitnesses spontaneously exclaimed about recklessness of the driving

Reckless driving checklist -- 4. Environmental Conditions

Officer's observations about state of the road, etc.. Was this type of driving particularly bad / dangerous under the circumstances?

- Example: **The driving--**fast weaving through traffic. **The environment--**twilight (poor lighting), icy road.

Environmental Conditions		
Dark, or twilight	Narrow road	Residential area
Sun low, in drivers' eyes	Gravel or dirt road	Marked senior citizen, blind, school, or deaf zone
Raining	Gravel median or shoulder	Deer or horse crossing
Ice on the road	Oil on the road	Extensive parking in the middle of the road
Foggy	Flares in the road	Visible construction in progress
Unusually noisy	Bike lanes	Accident or other distraction on the road
Fireworks or other off-road distractions		Black marks on the road or divider

Reckless driving checklist

- Many officers included only information about the driving in their notes (unless there was an accident).

- By building a more complete picture,

  we could turn

  "That's *bad driving*, but is it *reckless?*"   (**NOT GUILTY**)

  into

  "Only a madman would drive like that!"   (**GUILTY**)

This is an example of a data collection checklist

Another example of a data collection checklist

http://ceb.com/freefromCEB/FreeActionGuides/cr11504.pdf

Here's How and When to Do It

ACTION GUIDE

November 2004

Handing a Wrongful Termination Action

William M. Crosby

CEB

CONTINUING EDUCATION OF THE BAR ■ CALIFORNIA

Oakland, California

Website: ceb.com

When Determining Whether to Pursue Other Po[...]

14. REVIEW POTENTIAL BENEFITS OF PLEADING R[...]
15. ASCERTAIN WHETHER APPLICABLE STATUTES[...]
16. RECOGNIZE POSSIBLE WORKERS' COMPENSA[...] PHYSICAL OR EMOTIONAL INJURY........................

When Evaluating Related Tort Claims.................

17. DETERMINE WHETHER YOU CAN PLEAD TORT[...] EMOTIONAL DISTRESS........................
18. DETERMINE WHETHER YOU CAN PLEAD INVAS[...]
19. DETERMINE WHETHER YOU CAN PLEAD DEFAM[...]
20. DETERMINE WHETHER YOU CAN PLEAD FRAUD[...]
21. DETERMINE WHETHER YOU CAN PLEAD INTER[...]
22. DETERMINE WHETHER YOU CAN PLEAD NEGLI[...]
23. DETERMINE WHETHER YOU CAN PLEAD FALSE[...]

Appendixes ....
A. SAMPLE INTAKE FORM.........
B. SAMPLE COMPLAINT FOR AGE DISCRIMINATIO[...]
C. SAMPLE COMPLAINT FOR WRONGFUL TERMIN[...]
D. SAMPLE COMPLAINT FOR PROMISSORY FRAU[...]
E. STATUTES AND CASES AFFECTING TERMINAT[...] PUBLIC EMPLOYEES.....................
F. CALENDAR OF DATES AND DEADLINES IN WRO[...]
G. JUDICIAL COUNCIL FORM INTERROGATORIES[...]

Exploratory Checklists @ CAST   Copyright © 2008

There are so many issues, so many types of facts to gather / consider, that a non-expert lawyer would be a fool to handle a case like this without some type of data collection checklist.

ABOUT THE EMPLOYER

Ascertain:

a. Correct legal name, address, state of incorporation, and principal place of business;

b. Nature of business;

c. Any potentially related entities, *e.g.,* a parent company (for purposes of jurisdiction, calculating net worth, and identifying conflicts);

d. Number of employees (see, *e.g., Jennings v Marralle* (1994) 8 C4th 121, 32 CR2d 275 (employer of fewer than 5 employees not subject to Fair Employment and Housing Act (FEHA) age-discrimination prohibition); Govt C §§12926(d), 12940(a) (employers of 5 or more subject to sexual orientation discrimination prohibition); Govt C §12945.2(b) (employer of 50 or more within 75 mile radius of worksite subject to Family Rights Act));

e. Employer's financial health; and

f. Any prior and current employment lawsuits in which employer is involved.

NOTE ➤

A direct employment relationship is not a prerequisite to Title VII liability if the defendant exercises sufficient power over an individual's employment opportunities. *Association of Mexican-American Educators v California* (9th Cir 2000) 231 F3d 572, 580.

If Government Employer

Ascertain whether employer is a government entity, because public employee may be, *e.g.:*

> *It's not just about what to ask. It's about why.*

Data collection checklists

- Gause & Weinberg's list of context-free questions illustrate the general characteristics of data collection checklists:

  - Help you prepare for the interview / meeting / data-collection-event: What types of information are you seeking? Why?

  - You don't ask them all. You ask the ones that are relevant under the circumstances.

    - *Coverage is broader than you need and broader than you would create on your own in a relatively short time.*

  - You don't ask them in the book's order. You ask in the order that seems natural under the circumstances.

EXPLORING REQUIREMENTS QUALITY BEFORE DESIGN
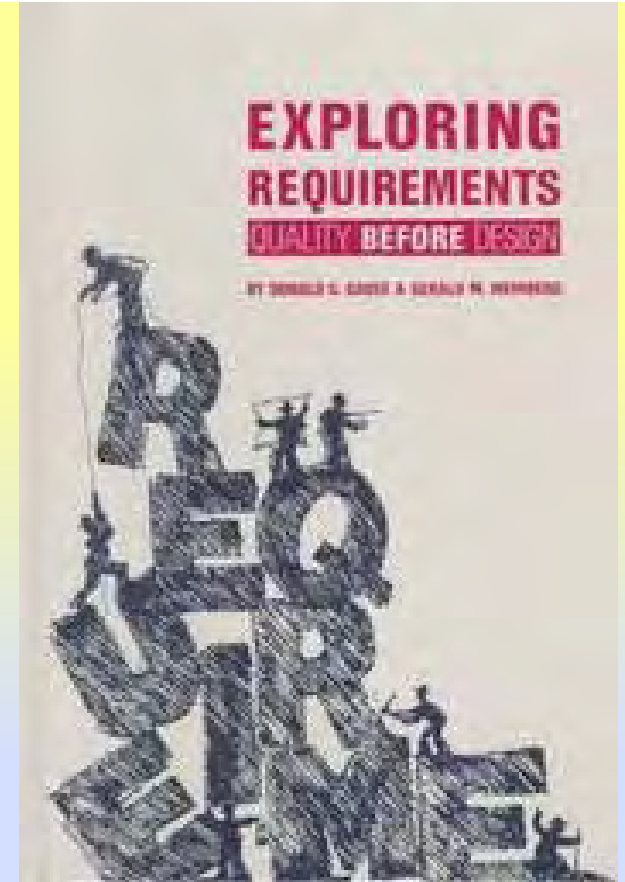
More examples in the www.testingeducation.org /BBST/BBSTSpecification Testing.html discussion of active reading.

These are cognitive aids, not scripts

Time sequence in...

Scripted testing

- Design the test early

- Execute it many times later

- Look for the same things each time

The highly cognitive work happens early, during test design. Execution is about following instructions.

Exploratory testing

- Design the test as needed

- Execute the test at time of design or reuse it later

- Vary the test as appropriate, whenever appropriate.

The highly cognitive work happens throughout testing, from early preparation (e.g. creating 1st draft checklists) to thoughtful design/execution

Cognitive engagement with...

Scripted testing

The smart test designer

- who rarely runs the tests

designs tests for **the cheap tester**

- who does what the designer says

- and looks for what the designer says to look for

- time and time again, independently of the risk profile.

The test designer is

- fully cognitively engaged during script creation, but

- execution is about following instructions (the person is more an automaton than a cognitively engaged tester.)

Checklisted testing

The smart checklist designer(s)

- captures test-relevant information

- and organizes it into lists

- list items are often annotated

for **the exploratory tester**

- who decides what to use, how to modify it, when and how to use it

The explorer is always responsible for managing the value of her own time. She should be fully engaged at all times, because she can do any combination of learning, designing, execution and interpretation at any time.
Checklist users are aided by, but not controlled by, the contents of the list.

More types of checklists

Data collection is just one type of checklist.

- **Data organizing**, to **help you learn** about a subject area (**including a product under test or its underlying subject matter**)

- Law schools often demand that students write their own outlines in first year, rather than learning the structure of a subject area by reading
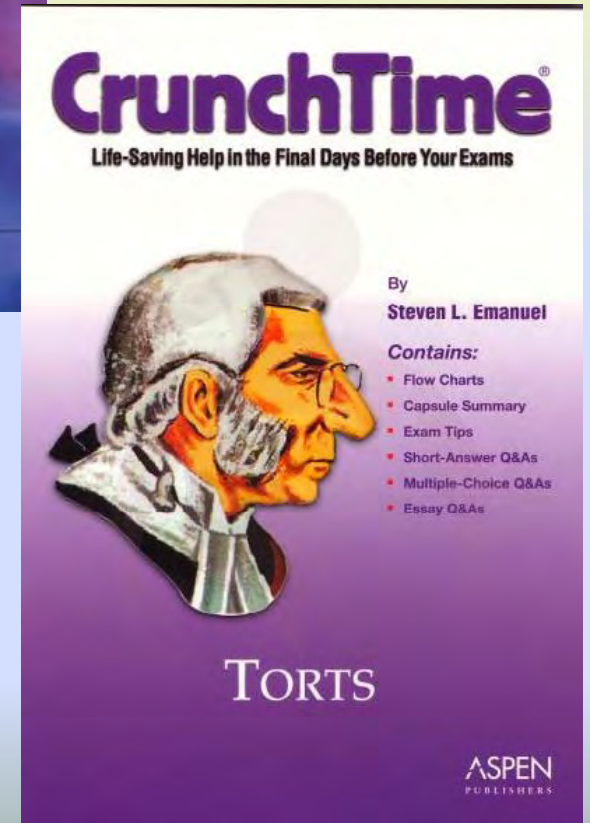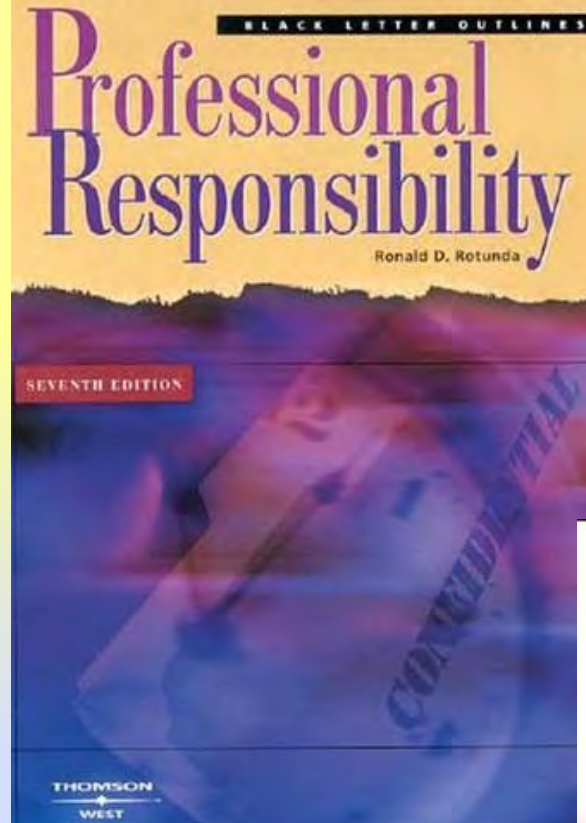
More types of checklists

- Creating a checklist or outline as a learning exercise is a personal task (each person has to learn the nature and details of a complex product / market-space).

- Variations on the theme of outlines that analyze and organize a product (or underlying subject matter):

  – Structure for teaching staff about the product

  – Structure for introducing remote outsources to the scope of the product / testing task

  – Structure for eliciting review of the tester's understanding of the material in the outline

We often hope for (and sometimes get) these benefits from scripts (especially reviewability) but the outline might be more reviewable because it can be more concise and less redundant.

More types of checklists

Mappings:

- Example: I have a contract, regulation, or statute that works well in New York. I want to have the same legal effect in Louisiana (or France, or China or etc.)
  - Map terminology (source to target jurisdiction)
  - Map court decisions, and the specific language that was interpreted by the source and target courts (NY Court says "these words mean X" and LA court says "these other words mean X"--if you want "X", use the NY words in NY and the LA words in LA)
  - Map "default rules"
  - etc.
- In software development, the same types of lists help:
  - **port testing, localization testing, managing multi-location project teams**

More types of checklists

Contract negotiating checklist: example at Cem Kaner, "An outline for software testing outsourcing." *Software Testing Analysis & Review Conference (STAR) East*, Orlando, FL, May 2000.
http://www.kaner.com/pdfs/outsource.pdf

- Collection of such things as:
    - definitions (and discussion of ambiguities)
    - issues addressed by contracts of this type
        ° common or suggested issue solutions / clauses / conditions
    - questions to ask to qualify the ability of the other party to fulfill the agreement
    - negotiating ideas (how to tell how urgently the other side needs this deal, etc.)
    - risks (how could this deal fail, in negotiation or after the agreement is in force?)

More types of checklists

Case preparation checklist:

- Collection of such things as:
    - definitions (and discussion of ambiguities)
    - outlines of relevant law
        - ° organized by the types of complaints (e.g. gender discrimination, unfair pay, layoffs)
        - ° information to gather
    - time-line for managing the case
   - negotiating advice

More types of checklist

- The contract negotiation and case prep checklists feel analogous, to me, to lists like:

- software failure mode and effects analyses (more generally, risk lists that discuss the nature of the risk and the tactics for testing for it instead of just listing them)

  – look at Giri Vijayaraghavan, "A Taxonomy of E-Commerce Risks and Failures." (Master's Thesis) Department of Computer Sciences at Florida Institute of Technology, Melbourne, FL, May 2002. http://www.testingeducation.org/a/tecrf.pdf

- test plan templates

  – IEEE 829 attempts to provide a flexible structure and heuristics for deciding which test documentation elements are most useful for your project

More types of checklist

- HAZOPS (hazard & operability studies) guidewords and other heuristic triggers for thinking of classes of risks or actions
    - Bach's Heuristic Test Strategy Model is intended as an adaptation/extension of HAZOPS to software testing, http://www.satisfice.com/tools/satisfice-tsm-4p.pdf
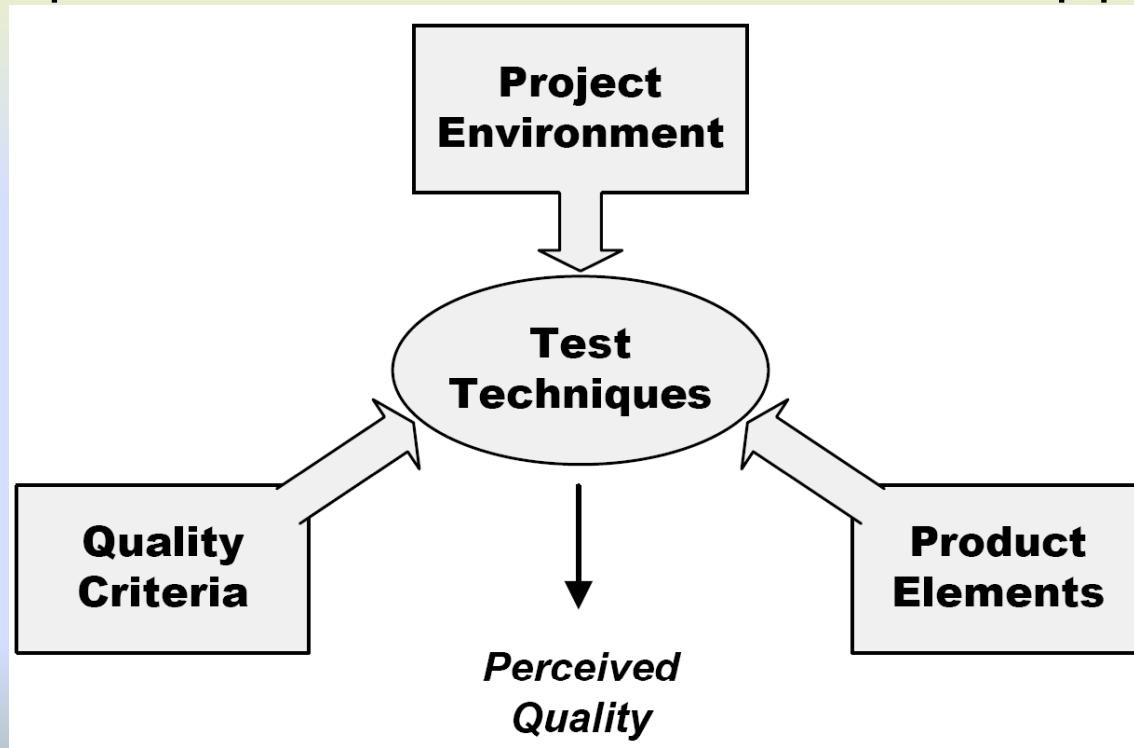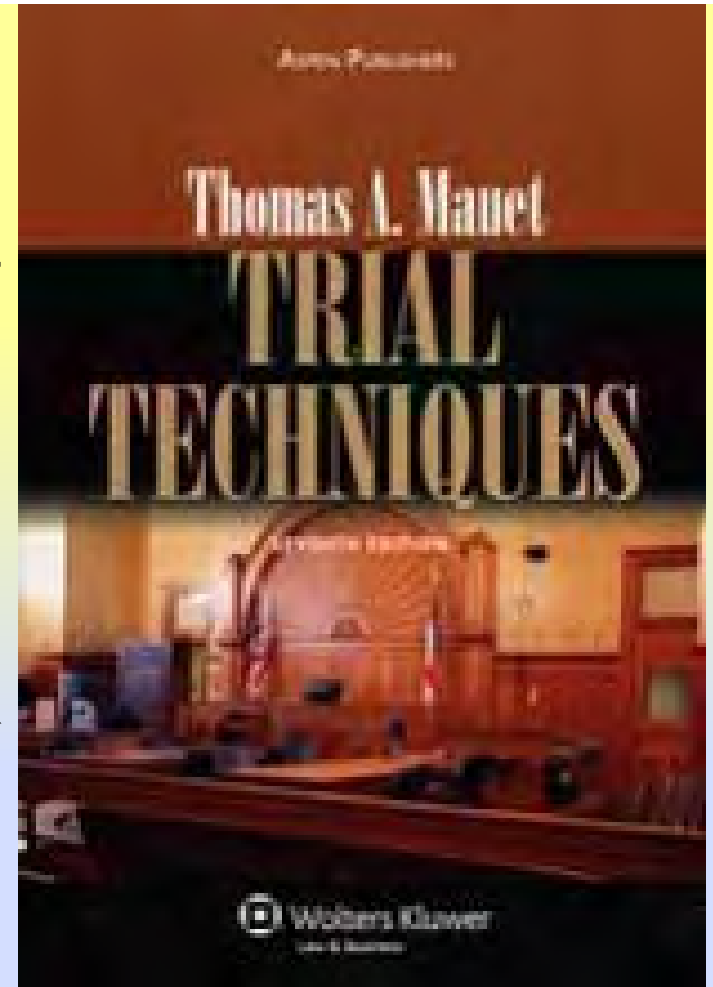
Finally, the procedural checklist

- Lawyers' practice guides often lay tasks out in a sequential structure (step 1, step 2, etc.)

- These can often look like a script

- Typically, they include a lot of supporting rationale (including court citations), enabling well-informed modification / variation.

- One of the harshest lessons for many law students was to not allow things that looked like scripts to function like scripts:
  - The difference is cognitive engagement:
    - When you create the document
    - When you use the document (use judgment, not just follow instructions)
  - Some tasks have a mandatory ordering (Example: you might have to send a demand for repayment to a debtor before you can bring a lawsuit for repayment), but many others do not.
  - When order is not mandatory, must be able to reorder, prioritize, etc.
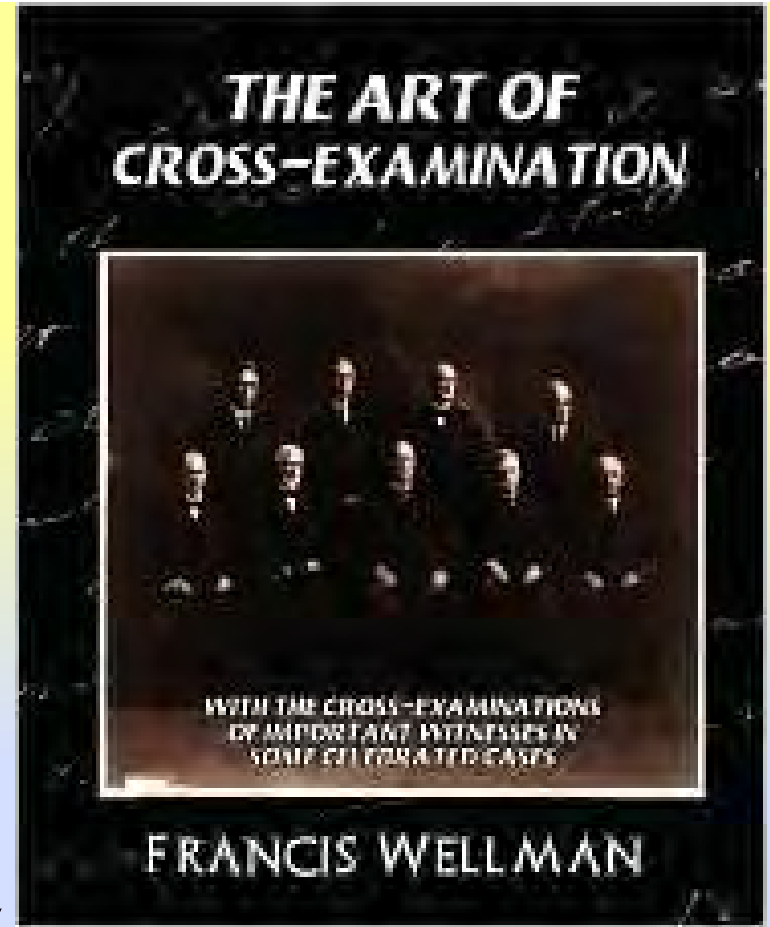
Procedural checklist - 2

Trial practice course:

- Books often provide a compelling sequence of questions for a witness

- Warn students not to rely on these as scripts, but assign exactly the same tasks (plan an examination of this type, to cover this factual situation for this type of trial).

- Let students get away with using the textbook analysis a couple of times.

- Then set up "stooge" witnesses or judges who will behave just slightly differently than the book. The student who cannot compensate in real time gets thoroughly humiliated.

- To be able to compensate in real time, you master the concepts / reasoning, not the sequence and words of the script.

Procedural checklist #3

- Very detailed sequential presentations can be:

  - scripts (if you are expected to follow / conform to the details)

  - examples (if you are expected to learn from the detail but extensively tailor the example to suit your situation)

- Wellman is a classic collection of glorious examples of examination of witnesses,

  - that should help the reader learn a way of thinking about how to do this type of task

  - but should not ever be reused directly (the other lawyer will recognize this and lay horrible traps for you)

Procedural checklist #4

- In software testing, the highly detailed sequential presentation of a set of test operations (do this, then do this, then do this, etc.)
  - might be a script (for bug reports, we WANT scripts)
  - but it might instead be a tutorial checklist
- If the intent and the use of the document is:
  - repeatable testing (do the same test the same way), it is a script
  - communication of test ideas (learn from these and then do related tests but probably in very different ways), it is not a script.
- If the intent of the document is:
  - to control the behavior of the tester, it is a script
  - to expand the tester's repertoire or set of ideas, it is not a script

In Closing

- Lawyers use checklists and predesigned forms, but customization is seen as a fundamental requirement of professionalism.

- Lawyers' checklists are rarely scripts.

- The peak period for malpractice suits against a lawyer is at about 10 years' practice and the rationale that I learned in courses from my insurance carriers was the lawyers get too comfortable, too much blind routine, not enough careful attention to the facts of the particular case, so the work gets sloppy and incompetent.

- When the Bach bros tell me about pilots' checklists (and what I hear coming from the cockpit when I fly), the lists are reminders, not scripts. They say what issues need attention, but not how to attend.

- When we escape the notion of repeatable controller, we find that test documentation can be terrifically useful for helping the tester understand the software under test and organize the attacks.

- The critical distinction is cognitive engagement / freedom at run-time.