



**Learning From Experience**  
**A Personal and Managerial**  
**Feedback Loop**

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Powerful Solutions Start With The Right Questions.

# A Universal Undesired Effect

- People are making too many mistakes
  - Some mistakes cause a lot of damage
  - Mistakes are caused because we act according to huge number of “not fully correct” paradigms
    - Not all the conditions for the paradigm to be valid are recognized
- Not always it is easy to pinpoint the flawed paradigm
  - Is it clear what was the flawed paradigm behind the financial crisis in 2008?
    - Lack of legislation?
    - Are you sure that with more legislation the crisis would not happen?
    - Are you sure what is going to happen to the economy next year?
  - If the flawed paradigm is not clearly identified and replaced then more mistakes will be caused

# Another undesired effect

- In a period where a significant change takes place, many people still operate according to paradigms that are not fully updated with the change
  - This is especially true for TOC implementations
  - Acting upon flawed paradigms does not necessarily represent resistance to the change
    - Inertia plays a role where people act without re-thinking
    - Not all the ramifications of the change are recognized and thus no preparations for them have been implemented
    - The change enforces new rules and some of the new cause-effects are virtually unknown

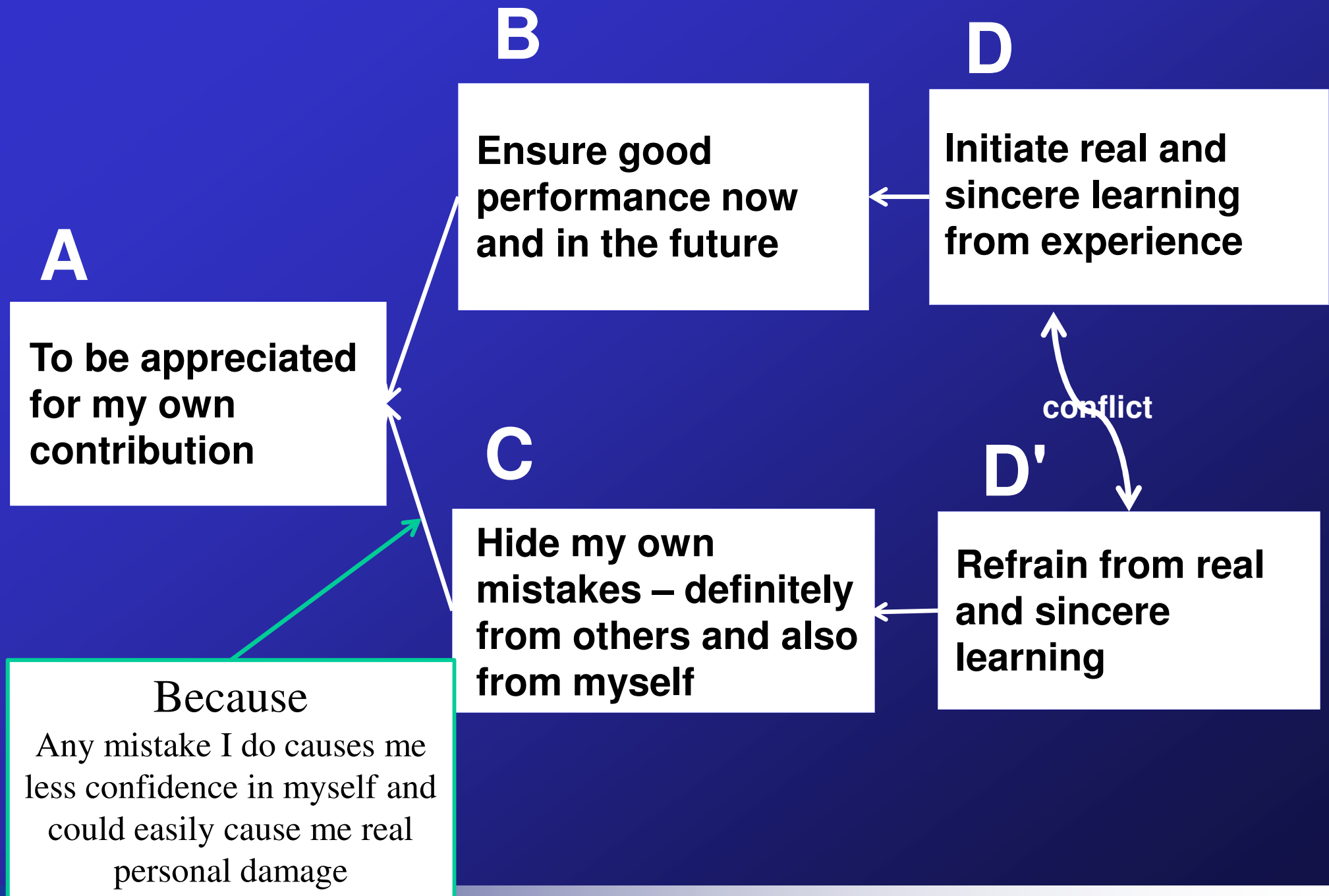
# Examples for the need to learn from events

- A software program crashed at a critical demonstration at its first large participation in an international exhibition
- More than 20 people were hospitalized in a hotel due to bad preparation of the food. A group of 120 tourists had to be evacuated and fly back home because there were no available rooms in other hotels
- A drug company had to recall a certain product because of a mistake in the mix of ingredients for a specific batch. The recall had to include all the existing stock
  - Two people were sacked due to the major mistake
  - Does it mean the RIGHT lesson was learned?

# Learning the RIGHT lesson from a specific event

- The objective is to implement a control system to quickly identify and correct faulty paradigms within the organization
  - It is a reactive process
  - It is geared to ensure that less flawed paradigms will cause mistakes that are especially damaging
  - There is a threat of learning the WRONG lesson
    - People usually stop at the first reasonable explanation
    - Too often people adopt the opposite paradigm as a lesson
    - People stop at the operational cause – not the paradigm

# The Threat of Learning



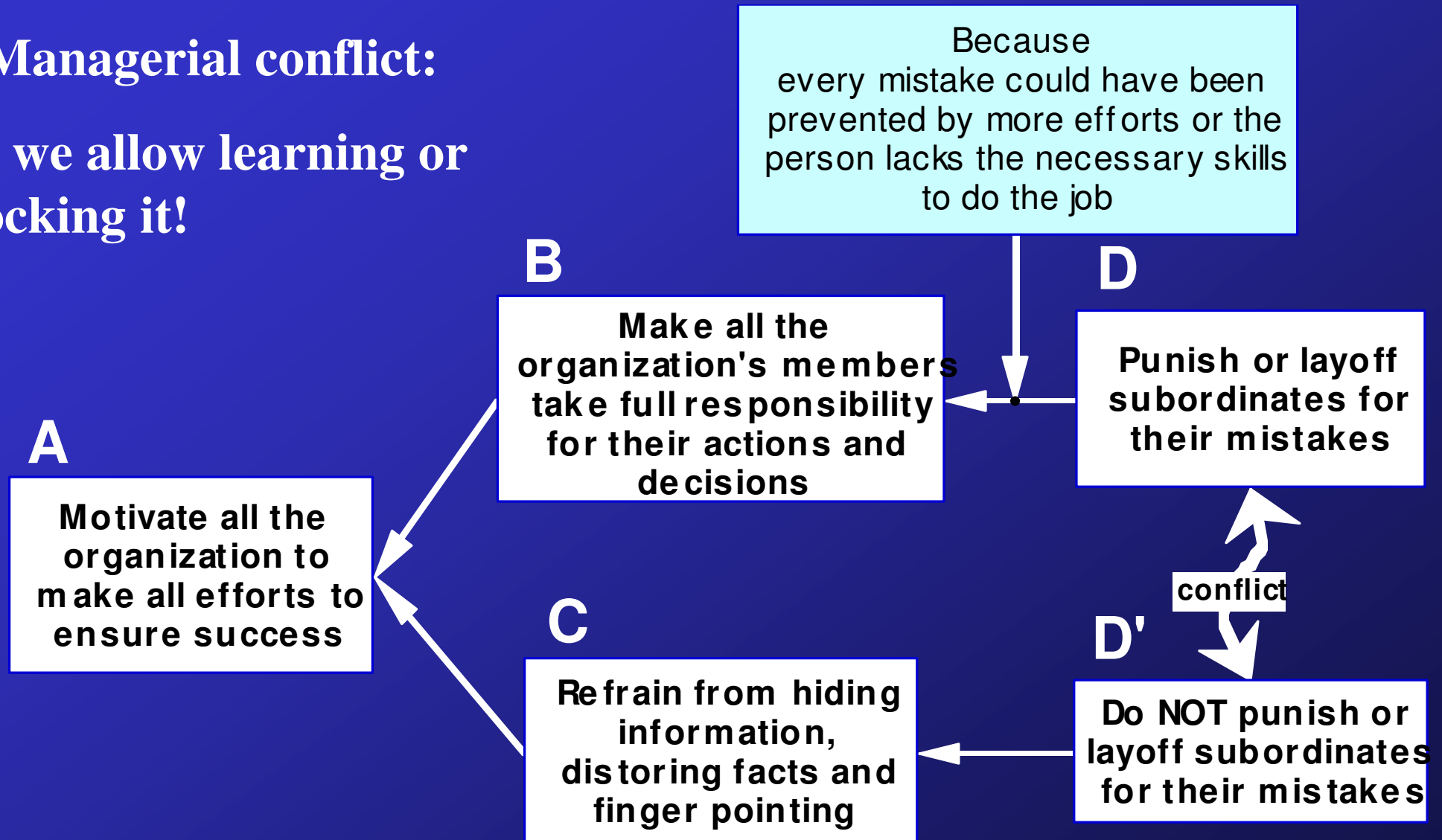
# On the habit of blaming others

- People tend to blame others very easily
- This effect is a threat to learning the right lessons:
  - It encourages people to hide their involvement in the unfortunate case
  - It conceals the systemic reason for the gap
  - Note, managers take responsibility for the performance of their area, and this responsibility includes making sure all the people involved have the proper capabilities and knowledge
- Thus, the learning process must clearly shy away of any blaming
- Develop the culture of learning from mistakes

# The managerial threat on learning

## A Managerial conflict:

**Do we allow learning or blocking it!**



# More on the term “paradigm”

- A paradigm is a pattern of thought
  - In TOC terms it is a small cause and effect tree that is accepted as true
    - For instance, if [I explain to X what needs to be done] and [X does not ask any questions] then [X knows what needs to be done]
- When Goldratt talked about the difficulty in accepting a “paradigm shift” he referred to a very significant paradigm
- The same flawed paradigm might be shared by many people within the organization
  - For instance, many American managers interpret the term “the market” as referring to the US market only

# The trigger for learning from an event

- A **flawed paradigm** sometimes causes a gap between prior expectations and actual outcomes
- **In other words: a surprise**
- The opposite statement is also true: any significant gap between prior expectations and reality is caused by certain flawed paradigm
- **Hence, the trigger for initiating a process of learning is being surprised**
  - The surprise is usually the first evidence of the existence of a **flawed paradigm**
- **If no structured learning, designed to draw the right lessons from updating the faulty paradigm, is in place then either the same paradigm will cause additional damage or too crude learning will cause new faulty paradigms**

# Learning from many events and learning from one event

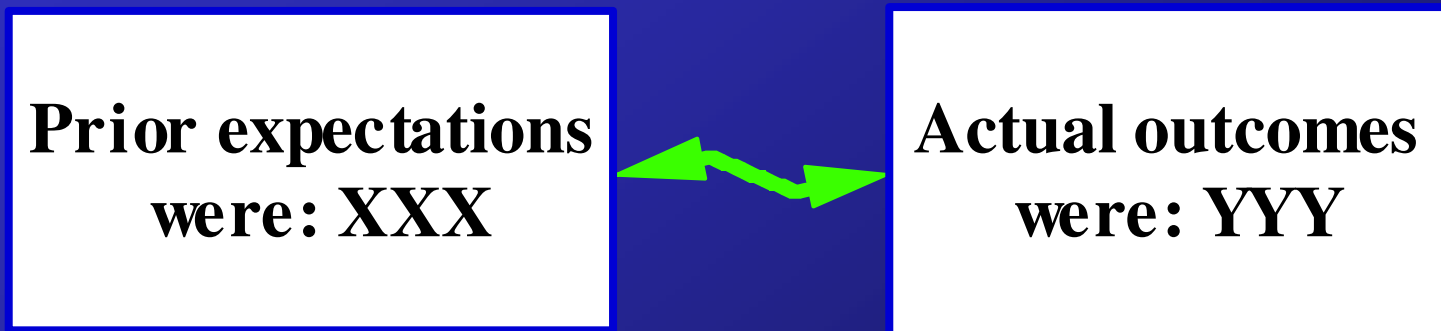
- TOC has developed the “thinking processes” (TP) – techniques that are based on logical analysis of cause and effect to identify the real root cause of a situation
- But, the learning from one single incident of a gap between expectations and outcome requires some minor changes:
  - Regular cause-and-effect are in present tense, but when we inquire a specific even – we have to use past tense
  - Which forces us to check many possible hypotheses
  - We cannot rely too much on intuition and thus we need to validate any proposed cause
    - The pattern of **effect-cause-effect**, where we look for another effect that is caused by the proposed cause has to be used
    - The search for facts is derived by the hypotheses and the need to validate them
- Another aspect of learning from one case is the need to generalize the lessons

# The focus of this learning process

- The analysis, using cause and effect logic should be focused on the cause and effect leading to the:

A gap between prior expectations and outcomes

- The gap is represented as:



- This representation provides two different categories of explanations:
  - Wrong expectations
  - Problematic execution

# The search after meaningful information

- The common practice in inquiring “unfortunate” events is to look for every piece of information that looks somewhat relevant
  - This is definitely a lengthy process where all the possibly relevant information is collected
- This way huge amount of data is collected and in too many cases the underlining learning is lost
  - It is difficult to see a clear pattern without having an idea where to look
- The proposed way is first to generate enough hypotheses on what happened, just from the very basic facts, and only then to look for the appropriate information that would validate, or invalidate, the data
  - The objective is to save a lot of time by being focused on the most likely causes that could explain the gap

# Example

- A patient died in a very routine surgery. Suppose that's all that is known initially
- That is enough to raise several key hypotheses:
  - The surgeon made a critical error
    - The surgeon was not appropriate for that surgery
    - The surgeon did not feel well
      - Tired, drunk, in pain
  - The patient got wrong treatment prior to the surgery
    - Wrong medicine, inappropriate anesthesia
  - The patient died from another cause
    - Another illness that was not spotted

# Example - continued

- The first hypothesis sends us to check whether the surgeon suffered from tiredness
- Suppose we found out the surgeon did not sleep in the last 24 hours
  - Hence, we put a cause and effect branch of:
    - If the surgeon did not sleep for 24 hours, then a major mistake in the surgery is possible, then it could explain a death in a routine case
    - Some reservations could be raised:
      - Is it enough to be tired to do a mistake? Could be that the surgeon is used to long no-sleep periods and still be capable to operate
      - Even if is possible that the cause could have generate the outcome, it is not certain this is what truly happened in the particular case
  - Checking the first reservation
    - Effect cause effect: if frequently surgeons have long no-sleep periods we should observe high number of mistakes towards the end of the period. It is probable that the nurses could testify to that

# Validating an effect

- We suffer from cutoff of all electricity at home
  - It could be caused by a short circuit
    - In most cases such a short circuit is caused by a flawed electrical device being connected to the voltage
      - So, if this incident happened – the cause of a short circuit is validated to a certain degree
  - It could be caused by a malfunction of electrical power in the area
    - If there is such a power failure we should not see any light at our neighbors
    - When you see all the environment is now dark – you have used the effect-cause-effect to validate your hypothesis
  - Note, we much more easily invalidate the existence of effects than proving they exist

# The formal inquiry within the organization

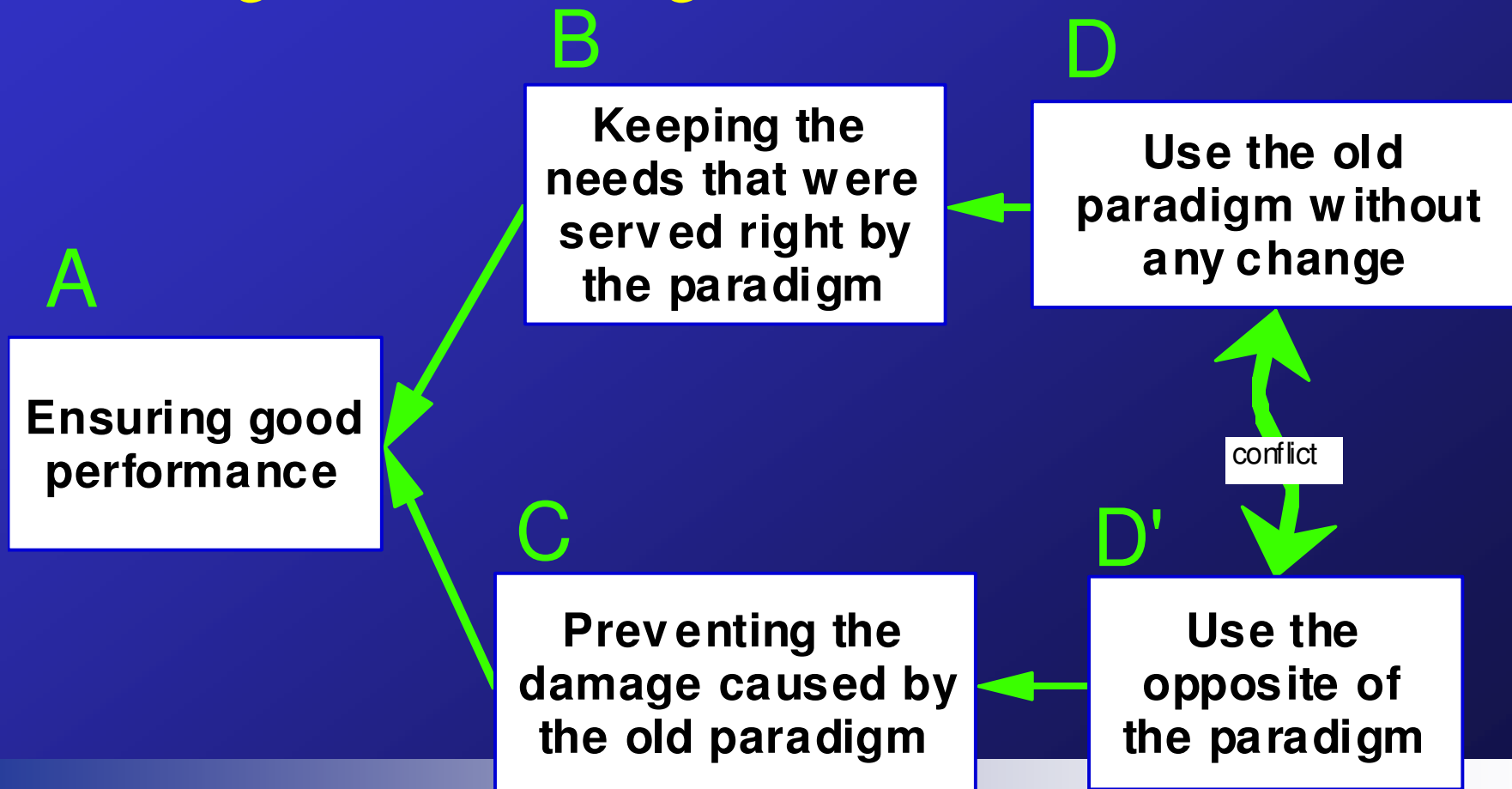
- It is recommended to create a dedicated team to inquire each major learning event. Within each team we need:
  - People with the most relevant intuition on this particular area
  - External people who are free from well rooted paradigms within the specific function or area
- Use brainstorming to raise as many hypotheses as it is practical
  - Each hypothesis should be clearly layout the cause and effects leading to the gap
- When do we stop to dive down?
  - When we clearly identify **a flawed paradigm!**
  - Do not stop when you identify the operational cause, like “The secretary forgot to inform the manager on the specific critical call” – reveal the paradigm that made this mistake possible
    - Should not the secretary have a clear procedure to record calls?

# Example - continued

- Suppose you found out it is **not common** to have surgeons operate after 24 hours without sleep
  - You have also found out that a minor mistake was done by the surgeon at the very start of the surgery
    - Which means that the surgeon was not at his best and he could do a more major mistake later in the operation
- Note, even if you feel that the cause has been validated is it only **the operational cause!**
  - How come a tired surgeon had to operate?
  - Would you expect the other people in the staff to note that the surgeon is too tired?
    - Could it be that all the nurses were afraid of reporting a too tired doctor?

# Once the flawed paradigm is identified

- The mission is now to correct the paradigm so it'll represent the reality as we know now
- The correction of the paradigm can be analyzed through the following cloud:



# Learning the lessons

- The corrected paradigm is now the source for cause and effect inquiry of the full ramifications of the change in the paradigm
  - In TOC terminology this is called the “future reality tree” (FRT)
  - The logic is to state clearly the new paradigm and together with other effects predict the new positive effects
- Possible negative effects (called ‘negative branches’ or NBRs in TOC) should be analyzed as well and ways to solve them be considered
- This logical prediction process is a generalization of the new lessons learned from just a single event
  - Certainly we expect that the operational cause for the gap would not happen again (or the chance for it happening is significantly reduces)
  - But, thinking about all the possible ramifications of the paradigm might lead to many more changes in the current processes

# The former example analyzed

- Suppose the learning analysis of the case of a patient dying from a routine surgery. The conclusions were:
  - The operational cause was a mistake of the surgeon
  - The main cause for the mistake was tiredness of the surgeon who hasn't slept for almost 48 hours!
  - The flawed paradigm was:  
**Surgeons are aware of their own physical limitations and thus are capable to know whether to carry an operation or not**
- A new paradigm was revealed:  
**Surgeons should not operate after 24 hours with no sleep**
- One could generalize the paradigm to: “Doctors and nurses should not give a treatment to patients after 24 hours without any sleep”

# Predicting the ramifications

- We certainly expect less mistakes being done in the medical treatment, due to doctors being more “in shape”
- However, some immediate negative branches are revealed:
  - A hospital might be out of medical capacity at certain peaks of demand and unavailability of the doctors who were occupied in the last 24 hours
    - And this is especially true in cases of major emergency
  - Also, the cost of maintaining hospitals will grow as they might need more doctors and nurses under the new paradigm and its associated procedures
- While the inquiry team deals with the conflict it could easily come up with a somewhat different updated paradigm:

**Whenever possible doctors and nurses who did not sleep for the last 24 hours would not give treatment to patients**

# The learning process cycle

- Step 1: **Identifying surprises**, evaluating the possible benefits of the structured learning and nominating the learning team
- Step 2: The team verbalizes the **gap between expectations and outcomes**
- Step 3: **Identifying the flawed paradigm(s)**
  - This analysis includes brainstorming for hypotheses, validating the existence of possible causes and diving down until the identification of the flawed paradigm
- Step 4: **Update the flawed paradigm**
  - The updated paradigm must express the right cause and effect for the reality as we see it then

# The learning process cycle

- Step 5: Predicting the future ramifications, put special emphasis to cover **all** the possible outcomes, especially the negative branches
  - Every negative branch should be addressed with a solution
  - It could be the case that changes to the updated paradigm would be introduced because of the negative branches
- Step 6: Develop all the new procedures that stem from the updated paradigm
- Step 7: Write down a document stating how the new understanding is based on the specific event
  - The purpose is to spread the new understanding of the cause and effect within the organization and institute the culture of learning without pain

# Example

- A high-tech organization won a bid to develop a system according to the specifications of the client
- In the acceptance test the system failed in several basic tests
- The organization suffered financial damage AND damage to its reputation
  - The project manager claimed the client misled him regarding the actual use of the system
- The learning has first identified the operational cause

The client defined the new system as **similar to a previous system**, the system engineer accepted that observation without checking the detailed specification

# Example continued

- The flawed paradigm was:

**Small changes in the specifications do not lead to dramatic changes in the overall performance of the system**

- The new paradigm:

**The definition of “similar systems” means that all the critical variables, those which have significant impact on the performance, are truly identical**

- The resulting process requires a “similarity” document to specify all the critical variables and thus substantiates the claim for “similarity”

# Example continued

- A negative branch is that constructing such a document takes time and could delay the acceptance of an order
  - The trimming injection is that the definition of the critical variables should not be too wide!

# Insights learned from implementations

- The verbalization of the GAP is usually not trivial, takes relatively long time, but has huge impact on the whole process
  - The other steps take much less time and are much more effective after the consensus on the gap
- Many flawed paradigms were revealed regarding the communication between people
- The ramifications from the corrected paradigm are many times very significant and cover wide area
  - Many of the teams admitted that they could not reach the conclusions without the structured process

# Insights learned from implementations

- Without full “thinking processes” (TP) training people raise hypotheses and explanation that lack sufficiency
  - Once people are aware to check the efficiency the simple and direct approach to logical claims is good enough
    - No urgent need for the full thinking processes tools
- In order to support the process as a key managerial control there is a need to implement **a process of documenting the expectations**
  - Even in project planning there are usually no clear written expectations regarding what should be regarded as a success or failure
    - Expectations should be documented, whenever possible, as a range out of which will be considered as a gap requiring learning

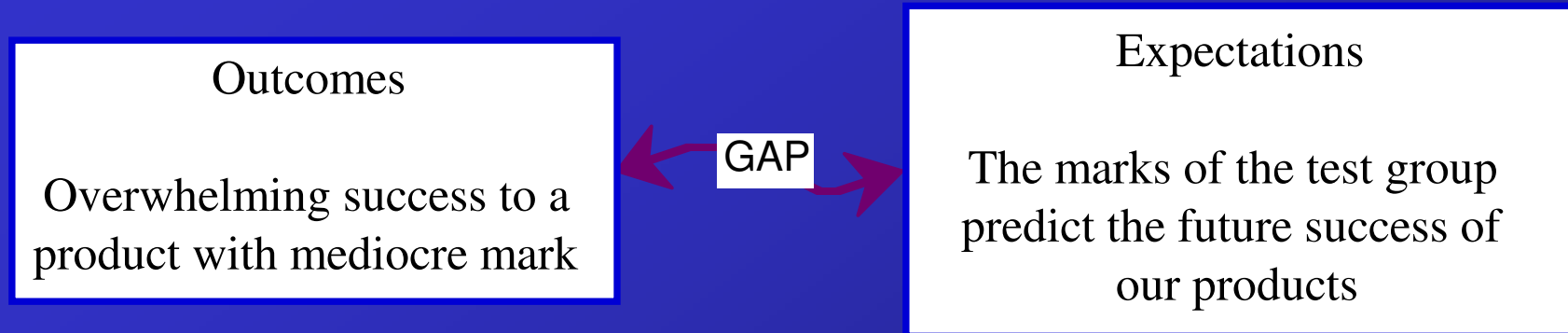
# Appendix – a fictional case as an example

- A US food company has acquired the services of a very known chef from Italy to develop a line of new soups
- The chef developed the “Honey-Sweet Soup” as the first product
- The “Honey-Sweet Soup” received relatively low mark of 5.85 out of 10 from the group of taste testers used by the food company
  - The policy is to launch only products that achieved at least a mark of 6 out of 10
  - The CEO decided to launch the new soup because of the embarrassment of the costs associated with inviting the Italian chef to the US

# A fictional Case - Continued

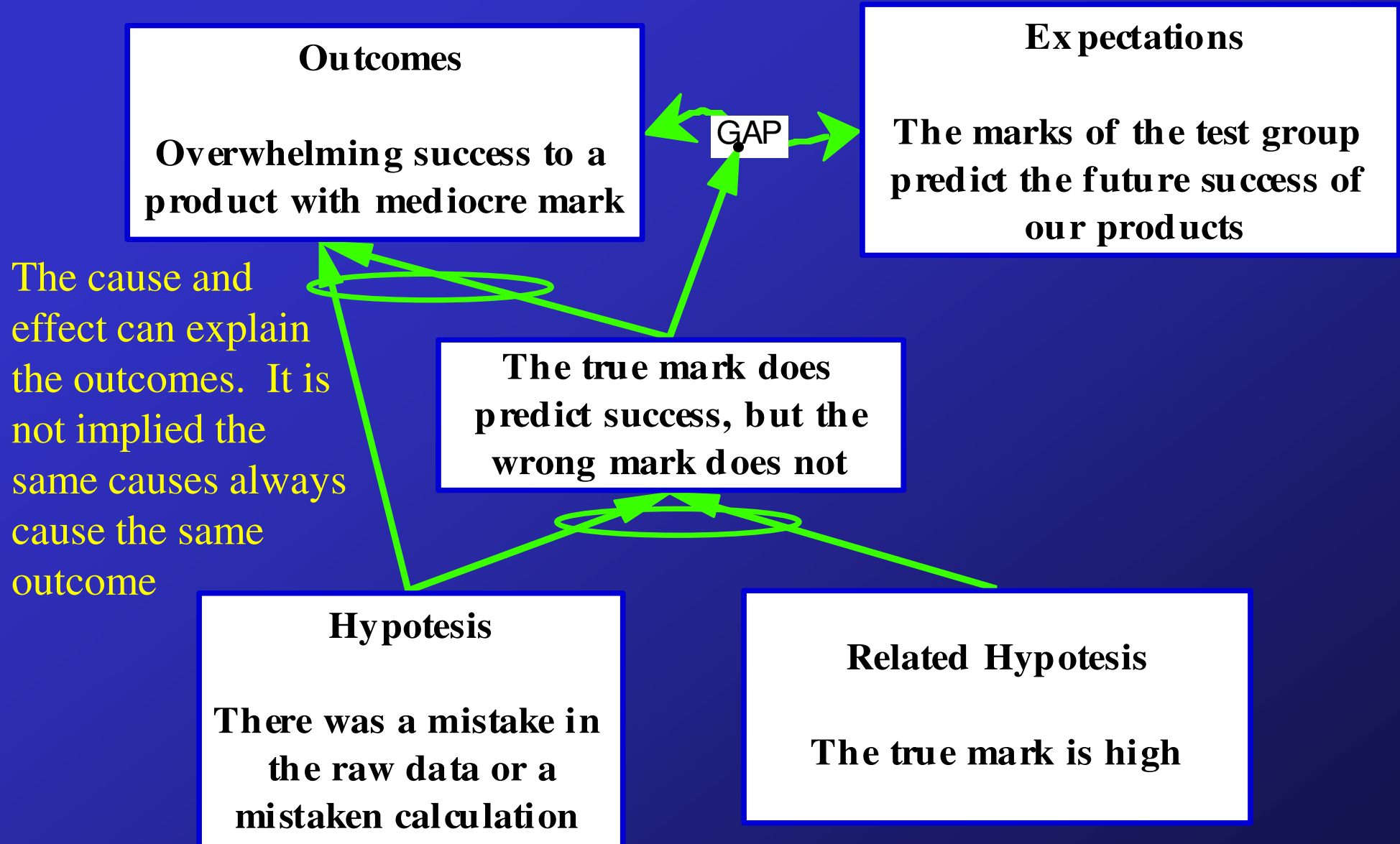
- One month after the formal launch of the soup the market demand went up dramatically
- The market continued to grow very fast. One year after the launch 'The Honey-Sweet Soup' became the most popular product of the company
- Does this unexpected success provide good opportunity to learn from?
  - It was certainly a surprise
  - Being unable to anticipate a success is problematic

# The gap and some initial hypotheses



- Initial hypotheses:
  - There was a mistake in the test data and/or analysis
  - The test group was not a valid sample of the market
  - It takes time to get used to a new and revolutionary taste
  - A mere statistical fluctuation
  - The launched product was not exactly the same as the one that was tested

# The first hypothesis looks like this



The facts behind the hypothesis need to be validated: was there really a mistake?

# Checking the validity of the hypothesis

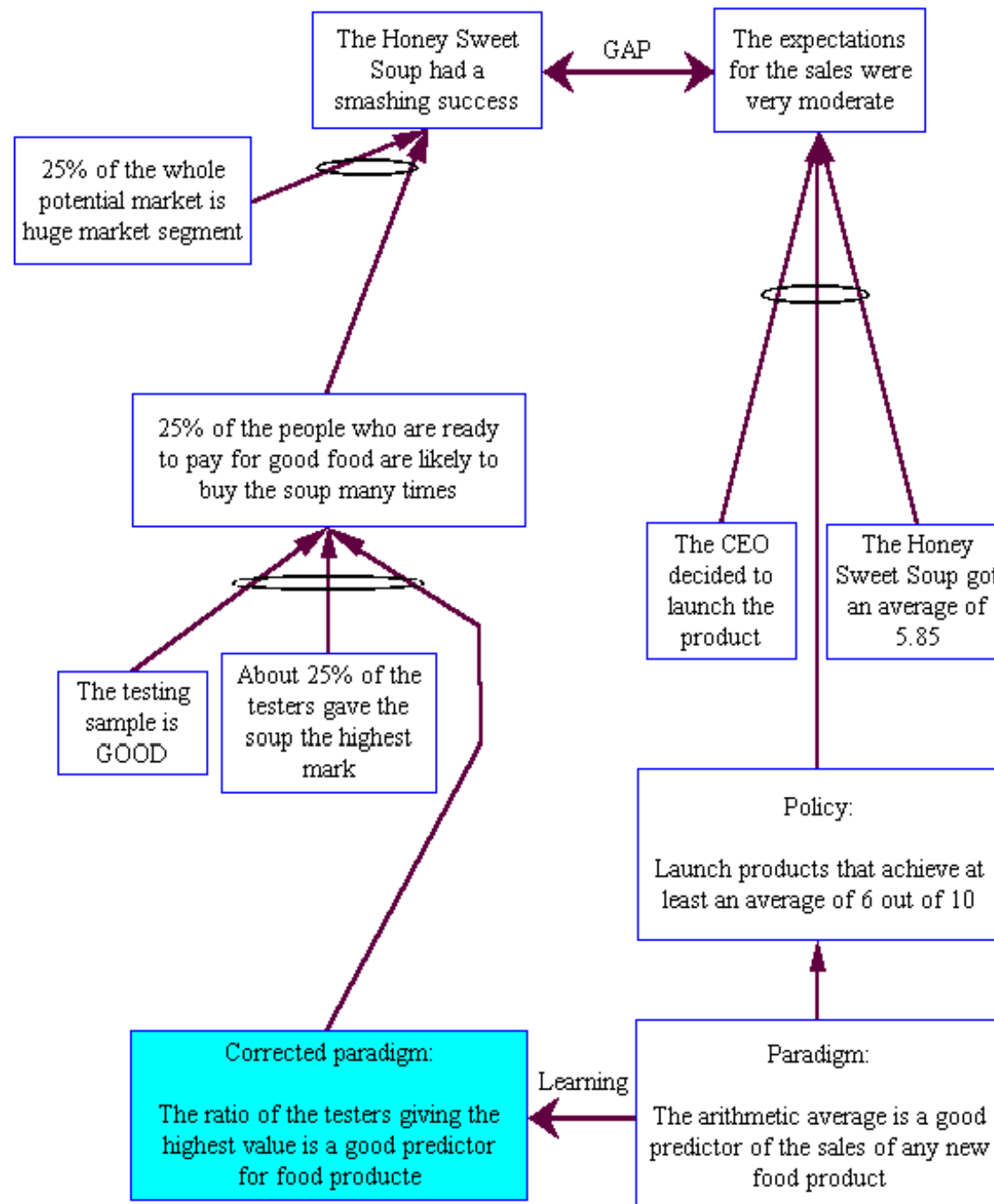
- Suppose that checking the data has invalidated the first hypothesis:
  - There was nothing wrong in the recording of the data and the calculation of the average
- But, there was something “strange” revealed by going over the raw data:
  - About 25% of the test group hated the soup and gave it the lowest mark possible (1 out of 10)
  - 20% loved the soup so much they gave it a mark of 10!
  - The rest was spread in the middle
- A new hypothesis can be now expressed as:

**The average might not be a good indicator of the success**

The percentage of the high marks is an overall better indicator

# Summary of the causality chain:

## Summary of the Causality Chain for the Case Study



# Constructing the new paradigm

- The validity of the new paradigm could be checked by inquiring past data:
  - Given historical testing data, would the prediction for success be better by using a percentage of the high marks?
  - This check is of the effect-cause-effect structure
- Certainly the company needs to define what marks should be considered as “high”
  - Should the mark be based on weighing of the individual marks? Is a mark of 10 weigh more than a mark of 8?

# Building the future-reality-tree (FRT)

- The immediate ramifications are to develop the computerized support based on the new paradigm
- Certainly some NBRs would be raised:
  - It seems that as long as the individual mark is below 6 it is not important anymore
    - Is this true for predicting products that are of moderate success only?
  - Knowing the different marking system might impact the testers to more extreme marking
    - This might distort the prediction of success

# Summary

- Mistakes are opportunities for updating our paradigms
- A **surprise** is a signal that we might learn from it
- The focus of learning from a single case is a **gap between prior expectations and actual outcomes**
- A team of people with a lot of intuition and outsiders is a good vehicle to carry the learning
- The search for information should be based on hypotheses and the need to validate or invalidate them
- The “operational cause”, meaning the facts leading to the gap is **not** the end of the analysis!

# Summary

- Behind the operational cause there is a **flawed paradigm**. Identifying the flawed paradigm should be the mission for the first part of the learning
- The next step is to re-verbalize the paradigm, so it'd represent the reality as we understand it now
- The next step is understand all the ramifications, including the negative branches, and come up with the appropriate processes that would correct the undesired effects of the flawed paradigm
- This learning should be spread through the organization, explaining the flawed paradigm and the updated one