Appendix B: Categories of Legitimate Reservation

The Categories of Legitimate Reservations—The Rules of Logic[1]

Goldratt developed a set of logic rules, called the *categories of legitimate reservations* (CLR), to improve communications when using the TP. The purposes of the CLR are to check your logic in constructing your own diagrams and to check the logic of another person's diagrams. They provide a precise methodology for pinpointing errors in your or another person's thinking. The CLR relate to entities or statements in a logic diagram. Three levels of categories of reservations exist. Each level probes deeper into investigating the logic structure. Many of these concepts are difficult to understand at first, but with a little practice, they become second nature. We provide the three levels and seven categories of reservations with examples in Fig. 25-B1 through B7. We will revisit these reservations again in this chapter as we present and illustrate each tool. Read each example provided in Figures 25-B1 through B7.

Level 1 Reservation (Clarity)

Clarity is used to develop a better understanding of an entity (a logical statement), the causality between two entities, or an area of the diagram. In studying a diagram and encountering any problem, the *clarity reservation* is used. It is always the first reservation used. You are asking the presenter to clarify so you can understand better (the cause entity, the effect entity, the causality connecting the two, an area of the diagram, and so on). For example, in Fig. 25-B1, the reviewer may not understand an entity such as 10 or 20, or she may not understand the causal linkage between 20 and 10, or she may not understand a whole segment of the diagram such as 20, 30, and 10. The reviewer would ask for *clarity.* If the presenter's explanation is unsatisfactory, then the reviewer should use one of the Level 2 reservations to pinpoint the misunderstanding.

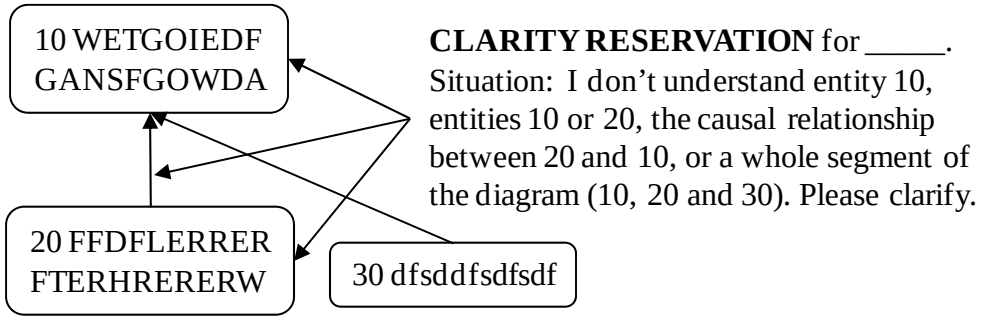
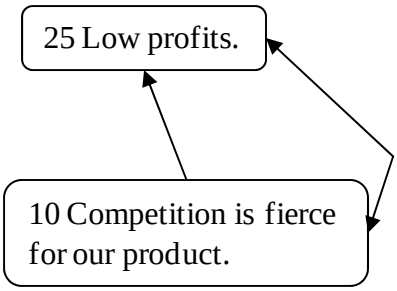


FIGURE 25-B1 Entity Existence Reservation.

Level 2 Reservations (Entity Existence and Causality Existence)

The entity existence and causality existence reservations are used to determine if the entity or statement itself exists or if the causality relationship exists. Examples are provided in Fig. 25-B2 and B3.

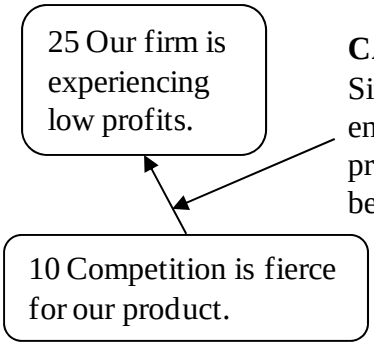
[1]From Cox et al., 2003, pp. 83–88. Used with permission.



ENTITY EXISTENCE RESERVATION for _____.
Situation: 25 is not a complete sentence.
What are you saying?
OR I don't believe that entity 10 exists in reality.
We have much higher quality and are priced lower than our competitor. Why do you say "competition is fierce for our product."

FIGURE 25-B2 Entity Existence Reservation.

Entity existence reservation is challenging the existence in reality of either the cause entity or the effect entity. For example, entity 25 is an incomplete sentence. In that state, it is difficult to determine if the entity exists at all. In addition, the reviewer could challenge whether an entity exists in the current environment—*entity existence reservation* for entity 10. The reviewer does not think that entity 10 "Competition is fierce for our product" exists. She offers as evidence that our company has higher quality and lower prices than competitors do.



CAUSALITY EXISTENCE RESERVATION for ____.
Situation: I don't believe that entity 10 is the cause of entity 25. This reservation is usually eliminated by providing the missing logical entities and connections between the two entities.

FIGURE 25-B3 Causality Existence Reservation.

Causality existence reservation is challenging whether causality exists between the two entities. It is challenging the causal arrow—Does the cause entity really cause the effect entity? The second example in Fig. 25-B3 provides a situation where the reviewer does not believe that entity 10 "Competition is fierce for our product" is the cause of entity 25 "Our firm is experiencing low profits."

If the presenter's explanation is unsatisfactory in showing the existence, then the reviewer should use the Level 3 reservations to pinpoint the misunderstanding. At Level 3, the reviewer must be ready to challenge the logical relationship using a specific reservation.

Level 3 Reservations (Additional Cause Reservation, Cause Insufficiency Reservation, House on Fire Reservation, and Predicted Effect Existence Reservation)
Level 3 challenges should only be used after applying the previous two levels.

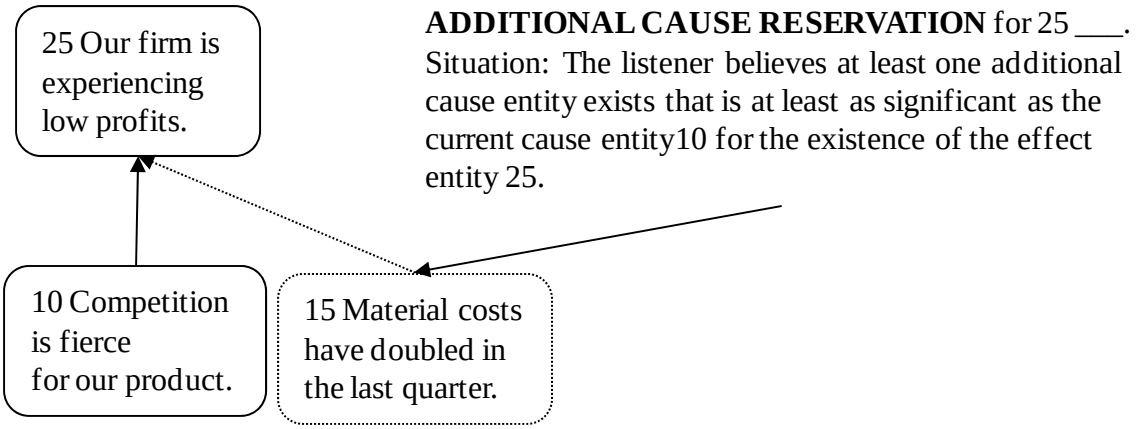


FIGURE 25-B4 Additional Cause Reservation.

The *additional cause reservation* is used to challenge that the presenter has captured the major causes of the effect entity. It is begging the question that there is at least another cause that creates at least as much damage as the current cause entity. A "magnitudinal and" connector is utilized to satisfy this reservation. Each cause entity independently contributes to the effect entity. If cause entity then effect entity. If (additional) cause entity then effect entity. This situation is indicated where two or more arrows enter an entity and have no "and" connector. Each cause independently contributes to the effect's existence. In this situation, all causes must be eliminated to eliminate the effect. In Fig. 25-B4, the reviewer believes that 15 "Material costs have doubled in the last quarter" has at least as significant an impact on 25 "Our firm is experiencing low profits" as does the suggested cause of 10 "Competition is fierce for our product."

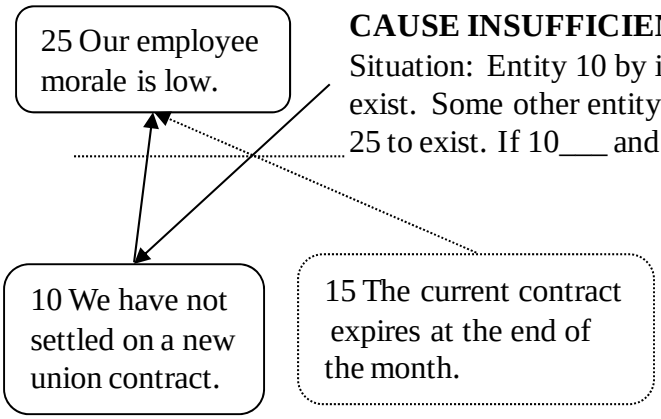
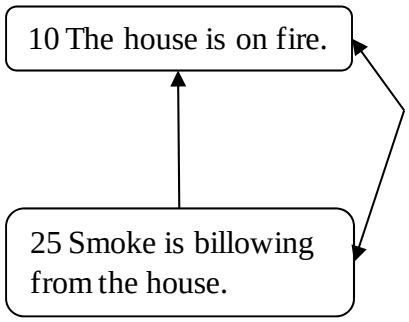


FIGURE 25-B5 Cause Insufficiency Reservation.

By using the *cause insufficiency reservation,* the listener is indicating that he or she believes that the current cause entity is insufficient by itself to cause the effect entity. It is begging the question that something else must also exist in addition to the current cause to create the effect. A "conceptual and" connector is usually required to satisfy this reservation. If cause entity and entity (or core driver) then effect entity. The connector is diagrammed as an ellipsis (sometimes called a banana) or line (which we use throughout the text) across the arrows. In Fig. 25-B5, the reviewer is challenging that entity 10 "We have not settled on a new union contract" could cause

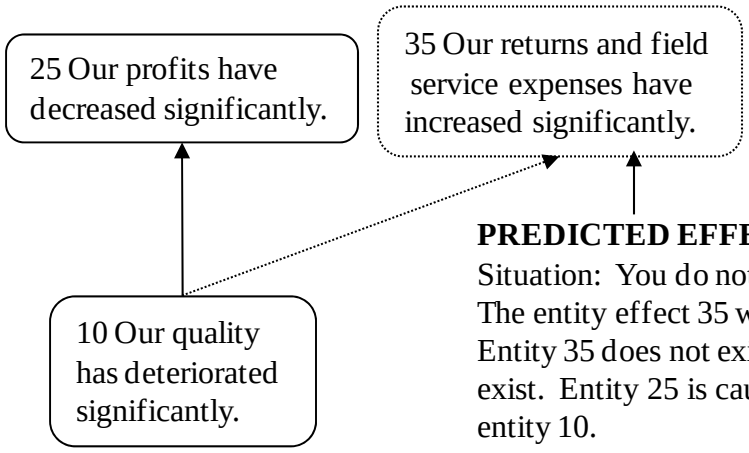
25 “Our employee morale is low.” She suggests that a more accurate explanation is: If 15 “The current contract expires at the end of the month” and 10 “We have not settled on a new union contract” then 25 “Our employee morale is low.”



HOUSE ON FIRE RESERVATION for 25 to 10.
Situation: The effect (25 entity) is *how you know* the cause (entity 10) exists, not *why* the entity 10 exists. The cause entity and the effect entity are reversed. You must dive deeper to determine why entity 10 exists.

FIGURE 25-B6 House on Fire Reservation.

The *house on fire reservation* (sometimes called the cause-effect reversal) is used to challenge the thought pattern where the cause and effect seem reversed. This usually occurs where the presenter confuses why the effect entity exists with how we know that the effect entity exists. For example (see Fig, 25-B6), if (cause) smoke is billowing from a house then (effect) the house is on fire is not valid logic. An electrical short circuit may cause the house being on fire. If (cause) the house wiring had an electrical short circuit then (effect) the house is on fire. The cause of the fire is a short circuit in the electrical wiring. The original statement is how we know the house is on fire, not the cause of the fire. The smoke billowing from the house is the result of the house being on fire. We have confused the cause with the effect. Ask “why” to determine the cause.



PREDICTED EFFECT RESERVATION for 10.
Situation: You do not believe entity 10 exists.
The entity effect 35 would exist if entity 10 existed. Entity 35 does not exist therefore entity 10 does not exist. Entity 25 is caused by something other than entity 10.

FIGURE 25-B7a Predicted Effect Reservation.

The *predicted effect existence reservation* is used to explain why you disagree with the presenter’s previous explanation and generally is the last reservation used. In this challenge, you are prepared to show the presenter that his or her logic is flawed. There are two types of

challenges—one questioning the existence of the cause entity and the other questioning the existence of the causality between the two entities. This challenge is presented by providing a counter example that if the predicted effect is present, then the cause cannot be present or if the effect is absent, then the cause cannot be present. In Fig. 25-B7a, If 10 “Our quality has deteriorated significantly” then 25 “Our profits have decreased significantly” would be validated by the existence of 35 “Our returns and field service expenses have increased significantly.” However, in examining our expenses this effect does not exist. The reviewer then challenges the existence of entity 10. Suppose the cause entity exists—what other predicted effect must be present? If that predicted effect is not present, then the cause is not present. Likewise, if the predicted effect exists it adds validity to entity 10 being the true cause of 25.

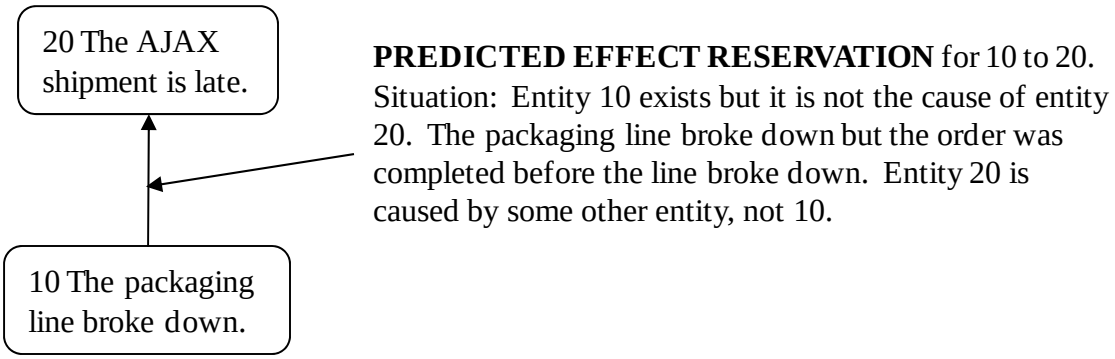


FIGURE 25-B7b Predicted Effect Reservation.

The challenge can be based on the existence of the causality—*predicted effect reservation* for 10 to 20. In the example in Figure 25-B7b, If 10 The packaging line broke down then 20 The AJAX shipment is late is challenged for causality—while the reviewer believes that both 10 and 20 exist, she does not believe that 10 caused 20. She offers as proof that the packaging line broke down after the AJAX order was completed; therefore, the line breaking down did not cause the order to be late.