Case-based reasoning (CBR). Information on situations (cases) is stored with the purpose of recalling cases that are similar to a target problem in order to help solve the problem. People commonly use this approach informally in problem solving and forecasting (see analogy). It can also be used as the basis for designing expert systems by starting with examples rather than with the process. CBR is a term used in the fields of cognitive science and artificial intelligence. The forecasting method of structured analogies could be viewed as one type of CBR. We have been unable to locate any tests of the predictive validity of CBR.

Game theory. Formal analysis of the behavior of two or more parties with divergent interests in situations that can be described by rules. For example, the Prisoner's Dilemma is one of the more popular of the games that have been studied. Game theoretic analysis seems to provide insight into historical situations involving conflict and cooperation, as shown by Nalebuff and Brandenburger (1996). To be useful, however, analysis must be done in advance of the outcome, and this is likely to be difficult. In effect, a game theorist must describe a game that is analogous to the target situation.

There has been ample time to research game theory. For example, the Nash equilibrium was described by Zeuthen in 1930 and the special case duopoly model was published by Cournot in 1838, both well before Nash's work was published in 1951 (Kaul & Fox, 1994). (Those who know Stigler's Law will not find it strange that the concept is called the Nash equilibrium). Yet little of the enormous effort devoted to research on game theory has been concerned with forecasting validity. Even as far back as 1960, Janowitz wrote that "a social science theory… based upon game theory appears to be an unfulfilled promise for it has not produced hypotheses and understanding beyond common sense" (Brandis, 1964). The research that does exist shows that simulated interaction provides more accurate predictions in situations that involve conflicts among the roles of the parties involved (Green, 2002). Another method, structured analogies, uses analogous real situations rather than an analogous game to forecast the outcome of a target situation. To date, however, little research has been done on the use of structured analogies.

- Brandis, R. (1964), "Game theory" in J. Gould & W. L. Kolb (eds.), *A Dictionary of the Social Sciences*. London: Tavistock.
- Kaul, T. K. & K. A. Fox (1994), "Game theory, economic applications" in D. Greenwald (ed.), *The McGraw-Hill Encyclopedia of Economics*, 2nd ed., New York: McGraw-Hill.
- Nalebuff , B. J. & Brandenburger, A. M. (1996), *Co-opetition*. New York: Doubleday.

Role playing: A technique whereby people play roles to understand or predict behavior. Roles have a strong influence on behavior (Armstrong 2001), including the forecasting behavior of decision makers. Role playing can be used to predict what will happen if conditions change or alternative strategies are considered. Armstrong (2001) has shown that forecasts from role playing are substantially more accurate than forecasts derived from expert opinions. He also describes the role playing process, which consists of the following steps:

Casting

- Those playing roles should be somewhat similar to the people they represent.

Role Instructions

- Describe the roles to subjects before they read the situation description.
- Ask the role players to act as they themselves would act given the role and the situation, or ask them to act as they believe the persons they represent would act.
- Instruct players to improvise but to remain within their roles.

Description of the Situation

- Describe the situation accurately and comprehensively, but briefly.
- Specify possible decisions for the role players when feasible.
- Provide realistic surroundings.

Administration

- Ask participants to act out their responses.
- Ask subjects to interact in a way that matches the actual decision-making situation.

Coding

- To reduce chances for misinterpretation, ask role players to write their view of the decision.
- If interpretation of the decision is required, have two or more people independently code the responses.

Number of Sessions

- Base predictions on results from a number of role-playing sessions.

When role playing is used is represent interactions among a small number of parties who are in conflict, it is referred to as simulated interaction.

- Armstrong, J. S. (2001), "Role-playing: A method to forecast decisions," in J. S. Armstrong (ed.), *Principles of Forecasting*. Norwell, MA: Kluwer Academic Press.

Simulated interaction (SI). Simulated interaction involves the acting out of interactions among people or groups who have roles that are likely to lead to conflict. SI is a subset of role playing, as role playing is also used for situations that do not involve interaction. See role playing for the procedure used in SI. SI is well-suited to forecast decisions in conflict situations such as those that might occur in labor-management negotiations, corporate takeover attempts, international relations, and warfare. An unaided expert must try to think through several rounds of interaction in order to make a forecast. In contrast, SI can realistically simulate interactions. SI can be used to forecast the effect of different strategies. For interactions involving role conflict, research has shown that SI provides forecasts that are substantially more accurate than those from game theory and from expert opinions (Green, 2002). To date, most research on SI has used role-players who were recruited without regard for their resemblance to the people in the target situation. It is expected that using role-players who resemble those involved in a target situation would lead to further gains in SI forecast accuracy.

Stigler's Law. "No scientific law is named after its original discoverer" (Holt, 2000, p. 60). If Stigler's Law is true, then Steven Stigler did not discover it. Stigler has stated that Robert K. Merton was the discoverer.

- Holt, Jim (2002), "Mistaken Identity Theory: Why Scientists Always Pick the Wrong Man," *Lingua Franca*, March.

Structured analogies (SA). Analogies are commonly used in an informal way when people make judgmental forecasts. In general, formalizing the techniques used by experts has been shown to increase accuracy (e.g., see Chapter 6 in *Long-Range Forecasting*.) Structured analogies involves domain experts selecting situations that are similar to a target situation, describing the similarities and differences, and providing an overall similarity rating for each similar (analogous) situation. The outcomes of the analogous situations are then used to forecast the outcome of the target situation. The analogous situations' outcomes can be weighted to forecast a target situation decision or to assign probabilities to possible decisions. The SA method can be used for situations where an unaided expert would need to think through several rounds of interaction between parties in conflict in order to make a forecast. To date, however, little research has been done on the use of SA for this purpose. SA depends on the availability of situations that are similar to the target. Simulated interaction does not have this limitation. SA is related to Case-Based Reasoning.