2 level game theory (Putnam)

Domestic politics and international relations are often somehow entangled.

Joseph Nye and Robert Keohane, emphasized interdependence and transnationalism, but the role of domestic factors slipped more and more out of focus, particularly as the concept of international regimes came to dominate the subfield

Ex: Bonn summit. Hyphesis: research suggests, first, that the key governments at Bonn adopted policies different from those that they would have pursued in the absence of international negotiations, but second, that agreement was possible only because a powerful minority within each government actually favored on domestic grounds the policy being demanded internationally. As Robert Strauss said of the Tokyo Round trade negotiations: "During my tenure as Special Trade Representative, I spent as much time negotiating with domestic constituents (both industry and labor) and members of the U.S. Congress as I did negotiating with our foreign trading partners.

The politics of many international negotiations can usefully be conceived as a two-level game. **At the national level, domestic groups pursue their interests by pressuring the government to adopt favorable policies, and politicians seek power by constructing coalitions among those groups. At the international level, national governments seek to maximize their own ability to satisfy domestic pressures, while minimizing the adverse consequences of foreign developments. Neither of the two games can be ignored by central decision-makers, so long as their countries remain interdependent, yet sovereign.**

Each national political leader appears at both game boards. Across the international table sit his foreign counterparts, and at his elbows sit diplomats and other international advisors. Around the domestic table behind him sit party and parliamentary figures, spokespersons for domestic agencies, representatives of key interest groups, and the leader's own political advisors.
The unusual complexity of this two-level game is that moves that are rational for a player at one board (such as raising energy prices, conceding territory, or limiting auto imports) may be impolitic for that same player at the other board. Nevertheless, there are powerful incentives for consistency between the two games.

A negotiator "attempts to build a package that will be acceptable both to the other side and to his bureaucracy." Negotiators representing two organizations meet to reach an agreement between them, subject to the constraint that any tentative agreement must be ratified by their respective organizations. The negotiators might be heads of government representing nations, for example, or labor and management representatives, or party leaders in a multiparty coalition, or a finance minister negotiating with an IMF team, or leaders of a House-Senate conference committee, or ethnic-group leaders in a consociational democracy.
For the moment, we shall presume that each side is represented by a single leader or "chief negotiator," and that this individual has no independent policy preferences, but seeks simply to achieve an agreement that will be attractive to his constituent. It is convenient analytically to decompose the process into two stages:
1. bargaining between the negotiators, leading to a tentative agreement; call that Level I.

2. separate discussions within each group of constituents about whether to ratify the agreement; call that Level 11.

In practice, expectational effects will be quite important. There are likely to be prior consultations and bargaining at Level I1 to hammer out an initial position for the Level I negotiations. Conversely, the need for Level I1 ratification is certain to affect the Level I bargaining. In fact, expectations of rejection at Level I1 may abort negotiations at Level I without any formal action at Level 11. For example, even though both the American and Iranian governments seem to have favored an arms-for-hostages deal, negotiations collapsed as soon as they became public and thus liable to de facto "ratification."

"Ratification" may entail a formal voting procedure at Level 11, such as the constitutionally required two-thirds vote of the U.S. Senate for ratifying treaties, but I use the term generically to refer to any decision-process at Level I1 that is required to endorse or implement a Level I agreement. The actors at Level I1 may represent bureaucratic agencies, interest groups, social classes, or even "public opinion." For example, if labor unions in a debtor country withhold necessary cooperation from an austerity program that the government has negotiated with the IMF, Level I1 ratification of the agreement may be said to have failed.

Given this set of arrangements, we may define the "win-set" for a given Level I1 constituency as the set of all possible Level I agreements that would "win-that is, gain the necessary majority among the constituents-when simply voted up or down. For two quite different reasons, the contours of the Level I1 win-sets are very important for understanding Level I agreements. First, **larger win-sets make Level I agreement more likely,** ceteris paribu~ By definition, any successful agreement must fall within the Level I1 winsets of each of the parties to the accord. Thus, agreement is possible only if those win-sets overlap, and the larger each win-set, the more likely they are to overlap. Conversely, **the smaller the win-sets, the greater the risk that the negotiations will break down**. For example, during the prolonged prewar Anglo-Argentine negotiations over the Falklands/Malvinas, several tentative agreements were rejected in one capital or the other for domestic political reasons; when it became clear that the initial British and Argentine win-sets did not overlap at all, war became virtually inevitable.

Unlike concerns about voluntary defection, concern about "deliver-ability" was a prominent element in the Bonn negotiations. In the post-summit press conference, President Carter stressed that **"each of us has been careful not to promise more than he can deliver."** A major issue throughout the negotiations was Carter's own ability to deliver on his energy commitments.

The Americans worked hard to convince the others, first, that the president was under severe domestic political constraints on energy issues, which limited what he could promise, but second, that he could deliver what he was prepared to promise. The negotiators in 1978 seemed to follow this presumption about one another: "He will do what he has promised, so long as what he has promised is clear and within his power."

Thus, to return to the issue of win-sets, the smaller the winsets, the greater the risk of involuntary defection, and hence the more applicable the literature about dilemmas of collective action.

The second reason why win-set size is important is that **the relative size of the respective Level I1 win-sets will affect the distribution of the joint gains**

from the international bargain. The larger the perceived win-set of a negotiator, the more he can be "pushed around" by the other Level I negotiators. Conversely, a small domestic win-set can be a bargaining advantage: "I'd like to accept your proposal, but I could never get it accepted at home." Lamenting the domestic constraints under which one must operate is (in the words of one experienced British diplomat) "the natural thing to say at the beginning of a tough negotiation. **"Third World leader whose domestic position is relatively weak (Argentina's Alfonsin?) should be able to drive a better bargain with his international creditors, other things being equal, than one whose domestic standing is more solid.**
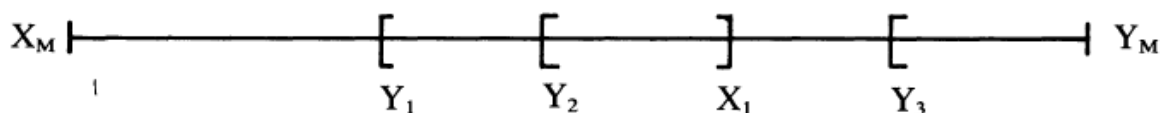
FIGURE 1. *Effects of reducing win-set size*

YM represent the maximum outcomes for X and Y, respectively, while X1 and Y1 represent the minimal outcomes that could be ratified. At this stage any agreement in the range between X1 and Y1 could be ratified by both parties. If the win-set of Y were contracted to, say, YZ (perhaps by requiring a larger majority for ratification), outcomes between Y1 and Y2 would no longer be feasible, and the range of feasible agreements would thus be truncated in Y's favor. However, if Y, emboldened by this success, were to reduce its win-set still further to Y3 (perhaps by requiring unanimity for ratification), the negotiators would suddenly find themselves deadlocked, for the win-sets no longer overlap at all.

   1. *The size of the win-set depends on the distribution of power, preferences, and possible coalitions among Level I1 constituents.*

The lower the cost of "no-agreement" to constituents, the smaller the winset.
No-agreement often represents the status quo, although in some cases no-agreement may in fact lead to a worsening situation.
Some constituents may face low costs from no-agreement, and others high costs, and the former will be more skeptical of Level I agreements than the latter. some constituents may offer either generic opposition to, or generic support for, Level I agreements, more or less independently of the specific content of the agreement, although naturally other constituents' decisions about ratification will be closely conditioned on the specifics. **The size of the win-set (and thus the negotiating room of the Level I negotiator) depends on the relative size of the "isolationist" ,forces (who oppose international cooperation in general) and the "internationalists" (who offer "all-purpose" support).** All-purpose support for international agreements is probably greater in smaller, more dependent countries with more open economies, as compared to more self-sufficient countries, like the United States, for most of whose citizens the costs of no- agreement are generally lower.

The problems facing Level I negotiators dealing with a *homogeneous* (or "boundary") conflict are quite different from those facing negotiators dealing with a *heterogeneous* (or "factional") conflict. Glancing over his shoulder at Level 2, the negotiator's main problem in a homogeneous conflict is to manage the discrepancy between his constituents' expectations and the negotiable outcome. Neither negotiator is likely to find much sympathy for the enemy's demands among his own constituents, nor much support for his constituents' positions in the enemy camp. **The effect of domestic division, embodied in hard-line opposition from**

hawks, is to raise the risk of involuntary defection and thus to impede agreement at Level I. The common belief that domestic politics is inimical to international cooperation no doubt derives from such cases. The task of a negotiator grappling instead with a heterogeneous conflict is more complicated, but potentially more interesting.

The Level I negotiator may find silent allies at his opponent's domestic table. German labor unions might welcome foreign pressure on their own government to adopt a more expansive fiscal policy, and Italian bankers might welcome international demands for a more austere Italian monetary policy. Thus transnational alignments may emerge, tacit or explicit, in which domestic interests pressure their respective governments to adopt mutually supportive policies. domestic divisions may actually improve the prospects for international cooperation. For example, consider two different distributions of constituents' preferences as between three alternatives: A, B, and no agreement.

If 45 percent of the constituents rank these A > no-agreement > B, 45 percent rank them B > no-agreement > A, and 10 percent rank them B > A > no-agreement, then both A and B are in the win-set, even though B would win in a simple Level-11-only game. On the other hand, if 90 percent rank the alternatives A > no-agreement > B, while 10 percent still rank them B > A > no-agreement, then only A is in the win-set. In this sense, a government that is internally divided is more likely to be able to strike a deal interrnationally than one that is firmly committed to a single policy.

Participation rates vary across groups and across issues, and this variation often has implications for the size of the win-set. For example, when the costs and/or benefits of a proposed agreement are relatively concentrated, it is reasonable to expect that those constituents whose interests are most affected will exert special influence on the ratification process. One reason why Level I1 games are more important for trade negotiations than in monetary matters is that the "abstention rate" is higher on international monetary issues than on trade issues .

The composition of the active Level I1 constituency (and hence the character of the win-set) also varies with the politicization of the issue. Politicization often activates groups who are less worried about the costs of no agreement, thus reducing the effective win-set. For example, politicization of the Panama Canal issue seems to have reduced the negotiating flexibility on both sides of the diplomatic table. This is one reason why most professional diplomats emphasize the value of secrecy to successful negotiations.

Different tradeoffs:
The chief negotiator is faced with tradeoffs across different issues: how much to yield on mining rights in order to get sea-lane protection, how much to yield on citrus exports to get a better deal on beef, and so on. The implication of these tradeoffs for the respective win-sets can be analyzed in terms of iso-vote or "political indifference" curves. This technique is analogous to conventional indifference curve analysis, except that the operational measure is vote loss, not utility loss. Figure 2 provides an illustrative Edgeworth box analysis. The most-preferred outcome for A (the outcome which wins unanimous approval from both the beef industry and the citrus industry) is the upper right-hand corner *(Ahl),* a nd each curve concave to point AM represents the locus of all possible tradeoffs between the interests of ranchers and farmers, such that the net vote in favor of ratification at A's Level I1 is constant. The bold contour A,-A2 represents the minimal vote necessary for ratification by A, and the wedge-shaped area northeast of A,-A2 represents A's win-set. Similarly, B1-B2 represents the outcomes that are minimally ratifiable by B, and the lens-shaped area between A,-A2 and BI-B2 represents the set of feasible agreements. Although additional subtleties

(such as the nature of the "contract curve") might be extracted from this sort of analysis, the central point is simple: the possibility of package deals opens up a rich array of strategic alternatives for negotiators in a two level game.

One kind of issue linkage is absolutely crucial to understanding how domestic and international politics can become entangled. Suppose that a majority of constituents at Level I1 oppose a given policy (say, oil pricedecontrol), but that some members of that majority would be willing to switch their vote on that issue in return for more jobs (say, in export industries). If bargaining is limited to Level **11,** that tradeoff is not technically feasible, but if the chief negotiator can broker an international deal that delivers more jobs (say, via faster growth abroad), he can, in effect, overturn the initial outcome at the domestic table. Such a transnational issue linkage was a crucial element in the 1978 Bonn accord
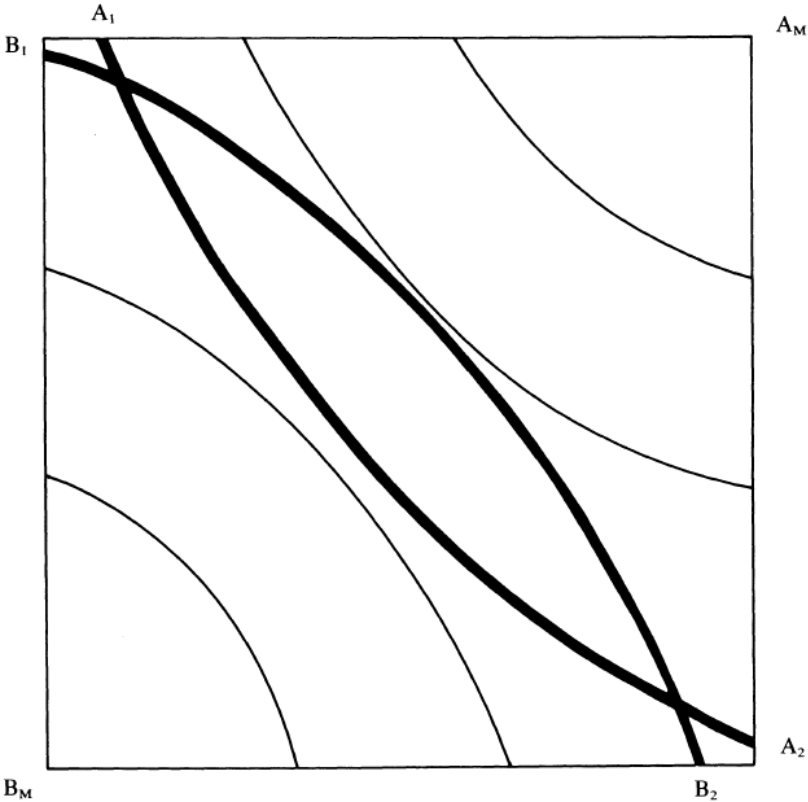
*The size of the win-set depends on the Level **II** political institutions.*

Ratification procedures clearly affect the size of the win-set. For example, if a two-thirds vote is required for ratification, the win-set will almost certainly be smaller than if only a simple majority is required.

Strong discipline within the governing party, for example, increases the win-set by widening the range of agreements for which the Level I negotiator can expect to receive backing. Conversely, a weakening of party discipline across the major Western nations would, ceteris paribus, reduce the scope for international cooperation.

The recent discussion of "state strength" and "state autonomy" is relevant here. The greater the autonomy of central decision-makers from their Level I1 constituents, the larger their win-set and thus the greater the likelihood of achieving international agreement. For example, central bank insulation from domestic political pressures in effect increases the win-set and thus the

odds for international monetary cooperation; recent proposals for an enhanced role for central bankers in international policy coordination rest on this point. However, two-level analysis also implies that, ceteris paribus, the stronger a state is in terms of autonomy from domestic pressures, the weaker its relative bargaining position internationally. For example, diplomats representing an entrenched dictatorship are less able than representatives of a democracy to claim credibly that domestic pressures preclude some disadvantageous deal. This is yet another facet of the disconcerting ambiguity of the notion of "state strength."

    2.   The size of the win-set depends on the strategies of the Level I negotiators.

Each Level I negotiator has an unequivocal interest in maximizing the other side's win-set, but with respect to his own win-set, his motives are mixed. The larger his win-set, the more easily he can conclude an agreement, but also the weaker his bargaining position vis-8-vis the other negotiator.

This fact often poses a tactical dilemma. For example, one effective way to demonstrate commitment to a given position in Level I bargaining is to rally support from one's constituents (for example, holding a strike vote, talking about a "missile gap," or denouncing "unfair trading practices" abroad).

On the other hand, such tactics may have irreversible effects on constituents' attitudes, hampering subsequent ratification of a compromise agreement. Conversely, preliminary consultations at home, aimed at "softening up" one's constituents in anticipation of a ratification struggle, can undercut a negotiator's ability to project an implacable image abroad.

Nevertheless, disregarding these dilemmas for the moment and assuming that a negotiator wishes to expand his win-set in order to encourage ratification of an agreement, he may exploit both conventional side-payments and generic "good will." The use of side-payments to attract marginal supporters is, of course, quite familiar in game theory, as well as in practical politics. For example, the Carter White House offered many inducements (such as public works projects) to help persuade wavering Senators to ratify the Panama Canal Treaty. In a two-level game the side-payments may come from unrelated domestic sources, as in this case, or they may be received as part of the international negotiation.

Level I negotiators are often in collusion, since each has an interest in helping the other to get the final deal ratified. In effect, they are moving jointly towards points of tangency between their respective political indifference curves. Note that each Level I negotiator has a strong interest in the popularity of his opposite number, since Party A's popularity increases the size of his win-set, and thus increases both the odds of success and the relative bargaining leverage of Party B. Thus, negotiators should normally be expected to try to reinforce one another's standing with their respective constituents

Higher status negotiators are likely to dispose of more side-payments and more "good will" at home, and hence foreigners prefer to negotiate with a head of government than with a lower official. In purely distributive terms, a nation might have a bargaining advantage if its chief negotiator were a mere clerk. Diplomats are acting rationally, not merely symbolically, when they refuse to negotiate with a counterpart of inferior rank. America's negotiating partners have reason for concern whenever the American president is domestically weakened.

A utility-maximizing negotiator must seek to convince his opposite number that his own win-set is "kinky," that is, that the proposed deal is certain to be ratified, but that a deal slightly more favorable to the opponent is unlikely to be ratified.

Restructuring and reverberation

Formally speaking, game-theoretic analysis requires that the structure of issues and payoffs be specified in advance. In reality, however, much of what happens in any bargaining situation involves attempts by the players to restructure the game and to alter one another's perceptions of the costs of no-agreement and the benefits of proposed agreements. Such tactics are more difficult in two-level games than in conventional negotiations, because it is harder to reach constituents on the other side with persuasive messages.
Nevertheless, governments do seek to expand one another's win-sets. Much ambassadorial activity-wooing opinion leaders, establishing contact with opposition parties, offering foreign aid to a friendly, but unstable government, and so on-has precisely this function. When Japanese officials visit Capitol Hill, or British diplomats lobby Irish-American leaders, they are seeking to relax domestic constraints that might otherwise prevent the administration from cooperating with their governments

Suasive reverberation is more likely among countries with close relations and is probably more frequent in economic than in political-military negotiations. Communiques from the Western summits are often cited by participants to domestic audiences as a way of legitimizing their policies. Reverberation as discussed thus far implies that international pressure expands the domestic win-set and facilitates agreement. However, reverberation can also be negative, in the sense that foreign pressure may create a domestic backlash. Negative reverberation is probably less common empirically than positive reverberation,

Track 2 diplomacy

Dilemme du prisonnier

Le **dilemme du prisonnier**, énoncé en 1950 par Albert W. Tucker à Princeton caractérise en théorie des jeux une situation où deux joueurs auraient intérêt à coopérer, mais où, en absence de communication entre les deux joueurs, chaque joueur choisira de trahir l'autre lorsque le jeu n'est joué qu'une fois. La raison à cela est que si un coopère et l'autre trahit, le coopérateur est fortement pénalisé. Pourtant si les deux joueurs trahissent, le résultat leur est moins favorable que si les deux avaient choisi de coopérer.

Lorsque le jeu est joué plusieurs fois de suite, il sert d'illustration au folk theorem **(en)** voulant que toutes les issues du jeu peuvent être des équilibres d'un jeu répété un assez grand nombre de fois.

Le dilemme du prisonnier est souvent évoqué dans des domaines comme l'économie, la biologie, la politique internationale, la psychologie, le traitement médiatique de la rumeur[1], et même l'émergence de règles morales dans des communautés.

Il a donné naissance à des jeux d'économie expérimentale testant la rationalité économique des joueurs et leur capacité à identifier l'équilibre de Nash d'un jeu.

Tucker suppose deux prisonniers (complices d'un crime) retenus dans des cellules séparées et qui ne peuvent communiquer; l'autorité pénitentiaire offre à chacun des prisonniers les choix suivants:

- si un des deux prisonniers dénonce l'autre, il est remis en liberté alors que le second obtient la peine maximale (10 ans) ;

- si les deux se dénoncent entre eux, ils seront condamnés à une peine plus légère (5 ans) ;

- si les deux refusent de dénoncer, la peine sera minimale (6 mois), faute d'éléments au dossier.

Ce problème modélise bien les questions de politique tarifaire : le concurrent qui baisse ses prix gagne des parts de marché et peut ainsi augmenter ses ventes et accroître éventuellement son bénéfice… mais si son concurrent principal en fait autant, les deux peuvent y perdre.

Ce jeu ne conduit pas spontanément à un état où on ne pourrait améliorer le bien-être d'un joueur sans détériorer celui d'un autre (c'est-à-dire un optimum de Pareto; voir aussi équilibre de Nash). À l'équilibre, chacun des prisonniers choisira probablement de faire défaut alors qu'ils gagneraient à coopérer : chacun est fortement incité à tricher, ce qui constitue le cœur du dilemme.

Si le jeu était répété, chaque joueur pourrait user de représailles envers l'autre joueur pour son absence de coopération, ou même simplement minimiser sa perte maximale en trahissant les fois suivantes. L'incitation à tricher devient alors inférieure à la menace de punition, ce qui introduit la possibilité de coopérer : la fin ne justifie plus les moyens.

Le dilemme du prisonnier est utilisé en économie, étudié en mathématiques, utile parfois aux psychologues, biologistes des écosystèmes et spécialistes de science politique. Leparadigme correspondant est également mentionné en philosophie et dans le domaine des sciences cognitives.

Dilemme du prisonnier classique

Formulation

La première expérience du dilemme du prisonnier a été réalisée en 1950 par Melvin Dresher et Merill Flood, qui travaillaient alors pour la RAND Corporation. Par la suite, Albert W. Tucker la présenta sous la forme d'une histoire :

Deux suspects sont arrêtés par la police. Mais les agents n'ont pas assez de preuves pour les inculper, donc ils les interrogent séparément en leur faisant la même offre. « *Si tu dénonces ton complice et qu'il ne te dénonce pas, tu seras remis en liberté et l'autre écopera de 10 ans de prison. Si tu le dénonces et lui aussi, vous écoperez tous les deux de 5 ans de prison. Si personne ne se dénonce, vous aurez tous deux 6 mois de prison.* »

On résume souvent les utilités de chacun dans ce tableau :

1 \ 2	Se tait	Dénonce
Se tait	(-1/2;-1/2)	(-10;0)
Dénonce	(0;-10)	(-5;-5)

Chacun des prisonniers réfléchit de son côté en considérant les deux cas possibles de réaction de son complice.

- « *Dans le cas où il me dénoncerait :*
  - *Si je me tais, je ferai 10 ans de prison ;*
  - *Mais si je le dénonce, je ne ferai que 5 ans.* »
- « *Dans le cas où il ne me dénoncerait pas :*
  - *Si je me tais, je ferai 6 mois de prison ;*
  - *Mais si je le dénonce, je serai libre.* »

« *Quel que soit son choix, j'ai donc intérêt à le dénoncer.* »

Si chacun des complices fait ce raisonnement, les deux vont probablement choisir de se dénoncer mutuellement, ce choix étant le plus empreint de rationalité. Conformément à l'énoncé, ils écoperont dès lors de 5 ans de prison chacun. Or, s'ils étaient tous deux restés silencieux, ils n'auraient écopé que de 6 mois chacun. Ainsi, lorsque chacun poursuit son intérêt individuel, le résultat obtenu n'est pas optimal au sens de Vilfredo Pareto.

Ce jeu est à somme non nulle, c'est-à-dire que la somme des gains pour les participants n'est pas toujours la même : il soulève une question de coopération.

Pour qu'il y ait dilemme, la tentation T (je le dénonce, il se tait) doit payer plus que la coopération C (on se tait tous les deux), qui doit rapporter plus que la punition pour égoïsme P (je le dénonce, il me dénonce), qui doit être plus valorisante que la duperie D (je me tais, il me dénonce). Ceci est formalisé par :

T > C > P > D (ici : 0 > -0,5 > -5 > -10)

Pour qu'une collaboration puisse naître dans un dilemme répété (ou itératif) (voir plus bas), 2 coups de coopération C doit être plus valorisant que l'alternat Tentation / Dupe. Ce qui fait la condition 2C > T+D [ici : 2*-0,5 > 0 + (-10)].

La négociation

LES OBJECTIFS DE LA NEGOCIATION

En dépit des transformations du système international, les règles de la négociation obéissent à des constantes.

Pour négocier, il faut au moins être deux. L'acteur qui prend l'initiative doit avoir, pour initier le processus, un objectif direct ou indirect à atteindre. Celui qui se joint à lui doit y voir un avantage
ou y être contraint.

On peut regrouper en un certain nombre de catégories les objectifs poursuivis par les acteurs d'une négociation.
L'extension dans le temps : il s'agit de prolonger les conditions existantes pour confirmer un statu quo, le renouvellement d'un accord culturel entre deux pays, ou d'un accord prolongeant la présence militaire, à l'intérieur de bases ou de facilités accordées par un pays à un autre par exemple.

La normalisation : il s'agit de redresser une situation considérée comme anormale, ou de consacrer un accord auquel on vient de parvenir. La négociation qui suivra un cessez-le-feu et qui permettra le rétablissement des relations diplomatiques entre deux Etats en guerre ou qui mettra fin à l'occupation d'un territoire, est typique de ce genre de négociation.
s'agit là d'un « jeu à somme nulle », pour employer une formule de T. Schelling dans The Strategy of Conflict, qui consacre les gains en territoire, en influence, d'un acteur sur un autre

qui, par crainte de pertes plus grandes encore, consent à la redistribution à laquelle il est associé mais qui consacre sa défaite. Le traité de Versailles de 1871 entre la France et le Reich triomphant est un parfait exemple de ce type de négociation. Les négociations de normalisation ou de redistribution ont dominé l'Europe classique.

L'innovation : le but recherché est de modifier une situation existante mais, si possible, au profit de toutes les parties. Les négociations d'armes control sont des négociations d'innovation, comme le traité sur la non-prolifération des armes nucléaires ou les accords salt.

L'effet indirect : on peut négocier pour obtenir un résultat indirect qui peut être un effet de propagande, des informations secrètes que le processus de négociation permet d'obtenir.

La négociation peut être également recherchée pour gagner du temps et/ou tromper l'adversaire. Dans un splendide passage de L'Europe et la Révolution française (6), l'historien français Albert Sorel décrit les manguvres dilatoires d'un Metternich avant la bataille de Leipzig en juin 1813, trompant Napoléon pour donner le temps aux armées des coalisés de se préparer à la bataille des nations. Par le pacte germano-soviétique conclu en août 1939, Hitler et Staline ne font pas autre chose que gagner du temps.

La négociation pour la négociation : l'objectif recherché est tout simplement la négociation pour elle-même. Pendant la crise de Berlin, 1961-1962, le but des Alliés occidentaux est avant tout de maintenir le contact pour éviter que la situation n'échappe au contrôle des acteurs. La simple présence dans une négociation peut conférer à un participant un statut qu'il n'avait pas précédemment (c'est le cas du Piémont à la Conférence de Paris qui met fin à la guerre de Crimée en 1856) ou lui procurer une légitimité retrouvée au sein du concert des nations (c'est l'exemple de la France au Congrès de Vienne en 1815).