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**FORCE AND AMBIGUITY : EVALUATING SOURCES
FOR CROSS-NATIONAL RESEARCH – THE CASE OF
MILITARY INTERVENTIONS**

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**Force and Ambiguity:
Evaluating Sources for Cross-National Research –
The Case of Military Interventions**

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The purpose of this paper is to discuss, based on a specific example (military interventions), some analytical problems involved in the construction and use of the ever increasing body of quantitative cross-national studies. Thanks to several waves of technological change, social scientists increasingly have recourse to large numerical databases, with the hope of extracting from them valid generalisations via probabilistic models. The models themselves have been subjected to an increasing sophistication. On the other hand, reflection on the nature of the data and of the counting procedures is still incipient. Yet such reflection is absolutely crucial. Practical researchers seldom read the small print that explains how databases are built, let alone invest time in studying the implications of this on the quality of their inferences. For example, the renowned democracy database, Polity,¹ is a standard reference point for quantitative investigators who want to study democracy or probe its degree of association with other variables. A query in JStore using simple criteria (Polity AND democracy AND journals since 1998) yielded 174 refereed journal articles, some of them very influential. Polity, however, is deeply problematic, and this will be explored in the following section. In the area of state failure and collapse the situation is worse. There has been a proliferation of databases, all of which have been the target of severe and authoritative criticism (Cammack et al. 2006). The quantitative study of civil wars is also highly suspect (Cramer 2003; Hegre and Sambanis 2006). We have chosen for our analysis the study of invasions,² because of its substantive importance but also because it is characterised by several positive traits, which might be missing in other fields, and which make quantification quite plausible. If we find problems here, *a fortiori* we would expect them to appear elsewhere.

As the previous paragraph suggests strong and consequential critiques about how global databases are built have already been made. Our paper pushes the analysis forward in two senses. First, there are problems that have not yet been acknowledged and we suggest that these might actually be the most fundamental ones. We call the already identified difficulties ‘Type A problems’, while the new ones that we discuss here we tag ‘Type B’. Second, we show that, in a sense, Type Bs are ‘intrinsic’: practitioners may be better or worse, more or less cunning and careful, but beyond their idiosyncratic skills and capacities the building of many databases (i.e. in the ‘general case’) will face some of the same sticky dilemmas. We stress, however, that we do not write in the spirit of technological conservatism: our purpose is to improve quantification, not to eschew it altogether.

In the first section of this paper, we briefly review two literatures: that relating to invasions, and to the evaluation of database building across several fields. In the second section we

¹ See <http://www.systemicpeace.org/polity/polity4.htm>.

² We use the terms intervention and invasion as if they were fully interchangeably expressions. In the context of this paper, invasion will mean military intervention.

show that, despite its comparative advantages, the interventions field faces severe Type A problems. The third section is dedicated to intrinsic ambiguity, i.e. Type B issues. In the conclusion, we suggest that formal models in the social sciences can, and should, take intrinsic ambiguity fully on board.

Literature Review

It is by no means an exaggeration to claim that, with regards to the field of interventions, Rosenau (1969) established a canon that is still useful today. There are two reasons for this rare - at any rate in the social sciences - stability. First, Rosenau provided what even today is more or less universally (in the field) recognised as the first fundamental definition of invasion issued explicitly for classificatory purposes (Rosenau 1969:161):

Two characteristics are usually associated with behaviour classified as interventionary. Indeed, although the association is often left implicit, it is so pervasive in the literature that the two characteristics would appear to be necessary attributes of interventionary phenomena and as such to provide the basis for an operational definition. One is what may be called convention breaking character of interventions. The other is their authority-oriented nature. Stated briefly, all kinds of observers from a variety of perspectives seem inclined to describe the behaviour of one international actor toward another as interventionary whenever the form of the behaviour constitutes a sharp break with then-existing forms AND whenever it is directed at changing or preserving the structure of political authority in the target society.

Second, Rosenau identified the characteristics that he believed made military interventions more amenable to quantification than other phenomena. They are such big scale operations, and such political highlights, that they inevitably leave traces. Compared with the study of civil wars, or state failure, where data are missing, or critically poor, precisely where they are most needed, interventions nearly always leave a wealth of public evidence. We may add that, since many of the most prominent invaders have been democratic countries, the process involved in the operation - from the decision to launch it to withdrawal - is registered and controlled by public organs and the media. Modern invasions are also generally bounded in time: they have a beginning and an end. Therefore, in contrast to political homicides for example, counting invasions should not be that difficult. 'For this reason', claims Rosenau (1969:155), 'interventions may be more easily operationalised and measured than is the case with other types of influence'.

Experience, though, has shown that Rosenau's expectations were overly optimistic. Both legal scholars and social scientists have discovered that to build a working operational definition of invasion is extremely difficult. Legal scholars faced a two-fold challenge: first, to coordinate the interests of powers that had contradictory interests, which additionally fluctuated (Nyiri 1989); and second, to deal with the fact that public definitions are also systems of incentives. For example, if military interventions are to be defined by the trespassing of the boundaries of a sovereign country by hostile uniformed troops of another country, as has frequently been the case, would-be interveners might choose to attack by indirect means, launching or supporting non-state armed challenges against the government they want to attack (e.g. Nyiri 1989). Is this method an intervention or not? The majority of mainstream jurists and diplomats answered the question positively, at one time or another; but of course indirect aggression is much more difficult to identify. Similar dilemmas were faced

by the major actors of the international system, for example at the UN Security Council (Ferencz 1972; Nyiri 1989).

Rather surprisingly, social scientists have been slower than lawyers to recognise the enormous centrality of the issue of interventions. Despite the fact that these seem to have a rather bright future, the field output remains relatively meagre. Reacting to Rosenau's programme, researchers have: a) criticised its deductive nature, suggesting a more historical and case-by-case approach (e.g. Finnemore 2003); b) proposed several different operationalisations, which have given origin to three major databases (Pearson and Baumann 1992; Regan 2002b and Tillema 1991); c) created probabilistic models to spell out the causes or consequences of invasions in a given period (for example, Hermann and Kegley 1996, 2001; Meernik 1996; Gleditsch et al. 2004; Pearson 1994; Pickering 2001; Regan 2002a; Tures 2005). In the process, several deficiencies at both the definitional and operational level have been uncovered. Hermann and Kegley, in their path-breaking reflection (2001), showed how any conclusion about the relation between interventions and democracy would depend on how we define the latter. We can have a purely procedural understanding of democracy, or one more related to the existence of certain basic liberties. They conclude that a procedural specification would permit more optimistic conclusions with respect to the impact of interventionism than a more conventional one (Hermann and Kegley 2001: 238, 243-244). Other authors, including database builders, have recognised, candidly and lucidly, that the counting procedure is not easy at all (see especially Tillema 1991).

Why should this be? The purported advantages that the study of invasions had in Rosenau's vision did not spare them some of the serious dilemmas generally faced by any database builder. Some of these were identified by Munck and Verkuilen, in their evaluation of democracy databases (2002), especially but not exclusively Polity. Their choice was no coincidence: democracy is a very central academic and political concern in the contemporary world. Additionally, Polity managers have been extremely careful in explaining explicitly how and why they have graded the level of democracy in each country or year. Only very few global databases have achieved the level of transparency and accessibility that Polity has. What are the problems of Polity and other major democracy databases according to Munck and Verkuilen? Mainly, that there are still 'important gaps' related to the conceptualisation of the category to be measured, a step that both materially and logically precedes measurement. Munck and Verkuilen find that, regarding definition, there are two big dangers: 'conceptual stretching' (Sartori 1970); and what may be called 'conceptual restriction'. Munck and Verkuilen observe that, in relation to democracy, researchers were too aware of stretching, but turned a blind eye to excessive restriction. Additionally, democracy is a multidimensional concept, but the ultimate result of each database is an aggregate index of democracy (for example, a mark between 0 and 10). Despite this, Munck and Verkuilen believe, the question of aggregation has not been sufficiently covered. 'The selection of level of aggregation', they note, 'calls for a delicate balancing act'. The 'sheer amount of attributes and information that can be associated with a richly developed' concept can become unmanageable:

On the other hand, it is necessary to recognise that the move to a higher level of aggregation may entail a loss of validity, in that information about systematic variation among the cases may be lost... the selection of the level of aggregation is an explicit choice that must be justified in light of the need to balance the desire for parsimony and the concern with underlying dimensionality and differentiation. (Munck and Verkuilen 2002: 22)

In other words, there is a trade-off between validity and tractability. This is an extremely important point, to which we will return below. Measurement itself is full of sunken reefs. Investigators have to juggle with multiple indicators for the same phenomenon, and they have no clear recipe to choose one or the other. Munck and Verkuilen showed how the intention of addressing this issue through radical simplification was self defeating. They conclude that:

..with a few notable exceptions, existing democracy indices have displayed a fairly low level of sophistication concerning the process of aggregation. The biggest problem is that most index constructors have simply assumed that it is appropriate and desirable to move up to the highest level of aggregation, that is, to a one-dimensional index. (Munck and Verkuilen 2002: 27).

Similar glaring flaws have also been found in other major databases and influential statistical exercises. For example, quantitative studies of civil wars have been challenged from many points of view: establishment of purely *ad hoc* cut-off points, wrong or equivocal proxies (e.g. Cramer 2003) and poor operationalisation of the concept - often the measurement simply does not capture the underlying idea. Let us see now how the interventions field fares in this regard.

‘Type A’ Problems

Despite the fact that it exhibits more conceptual coherence than several other fields, and that it deals with a comparatively simple (*vis-à-vis* democracy, say) and directly observable phenomenon, the study of interventions suffers from many of the drawbacks pinpointed by Munck and Verkuilen, among others. These are more or less immediately perceivable and here we highlight the main ones. First, there is an almost overwhelming conceptual dispersion. Despite the weight of Rosenau’s influence, every author adopts his or her personal definitional variant, occasionally unaware that subtle differences between one definition and another might alter decisively the quantification. In Table 1 we show the level of coincidence of the three major extant invasion databases.

Table 1: Correlation between the three databases

	Pearson & Baumann 1992	Regan 2002	Tillema 1991
Pearson & Baumann 1992	1		
Regan 2002	0,0566	1	
Tillema 1991	0,3526	0,118	1

It should be noted that they fully agree in only 15 percent of the cases: an almost purely random result. In other words, to decide what is or is not an invasion, one might as well toss a coin! Clearly, each database is counting different things. The root of the problem is related to Munck and Verkuilen’s stretching-restricting (or to put it another way, comprehensive but intractable vs. tractable but flat) dilemma. There are authors, and databases, that would try to stick to the most formalistic possible definition, to be able to identify with the maximum of clarity the cut-off points (where an event becomes interventionary). For example, both Pearson and Baumann (1992) and Tillema (1991) establish that an invasion must involve the movement of regular troops within the target country (See Table 2). Thus, they will count as invasions only those events in which uniformed members of the armed forces of a country trespass the borders of another (Gleditsch et al 2004; Hermann and Kegley 2001; Walter and Snyder 1999). But this is simultaneously too restrictive and too broad - and it completely

ignores the very long legal debate referred to above. It also produces severe anomalies.³ Other databases aim to be more inclusive (Regan 2002), but then where to establish the cut-off points for expanding your definition is a question that remains open. Second, the ‘delicate balance’ related to multidimensionality has not been achieved. Neither journal papers nor the codebooks of the databases explicitly justify the specific level of aggregation that has been chosen.

Table 2: Definition, Dimensions and Aggregation

Authors	Definition	Dimensions	Stretching or Restriction	Aggregation
Pearson & Baumann 1992	‘We continue to define military intervention operationally as the movement of regular troops or forces (airborne, seaborne, shelling, etc.) of one country into the territory or territorial waters of another country , or forceful military action by troops already stationed by one country inside another , in the context of some political issue or dispute . Regular forces here do not include paramilitary forces , as defined by the MILITARY BALANCE publications of the IISS, and since actions by border guards or police are therefore excluded , we run less risk than in the past of including very minor border skirmishes and shooting incidents.’	5	Restriction: It does not include paramilitary force and actions by border guards or police (skirmishes and shooting incidents)	Didn’t use
Regan 2002	‘I define third party interventions in intra-state conflicts as convention breaking military and/or economic activities in the internal affairs of a foreign country targeted at the authority structures of the government with the aim of affecting the balance of power between the government and opposition forces .’	4	Restriction: Civil war Stretching: military and economic	Didn’t use
Tillema 1991	‘ <i>Overt</i> military interventions represent direct military operation openly undertaken by a state’s regular military forces within foreign lands in such a manner as to risk immediate combat, hence war, <i>merely</i> if they encounter armed resistance... It represents all combat-ready foreign military operations undertaken by regular military forces and <i>only</i> such operation.’	4	Stretching: All combat	Didn’t use

Codification in the field of invasions remains basically idiosyncratic. For example, Tillema (1991) makes a gargantuan effort to substantiate the inclusion of his events on a case-by-case basis, but fails to explain the operational criteria used for such inclusion, let alone for exclusion. Idiosyncratic codification is not reliable, among other things because social scientific concepts are interactive and evolve historically (Cramer 2003, 2006; Finnemore 2003; *inter alia*). This in principle should not be considered an unsolvable problem, because by ‘climbing the ladder of abstraction’ (Sartori 1970) – or delimiting adequately the period – it is always possible to capture the essential aspects of the phenomenon. However, if historical malleability is not factored in, then the probable result will be definitions tailored to one period or to one type of invasion. More trying is the interactive, non-parametric (Elster

³ Events like the Bay of Pigs incursion, or operation PBsuccess, Sudan and Egypt in Chad (1981) are not included in any of the three databases. The major undertaking of the US in Nicaragua in the years 1989-1992 (ONUCA) is classified as an intervention by Pearson and Baumann, but not by Regan.

1992), character of the concept. This affects especially strongly all definitions related to the use of force. The post-World War II institutions were built having in mind the objective of preventing aggressive militarism. The cost of being tagged as an aggressor can be very high. Invaders therefore endeavour to conceal their acts. They do so juridically, trying to show that the event corresponds to some concept of legality and justice. They do so politically, maintaining that the invasion is legitimate for a variety of reasons. As the international context makes some forms of interventions particularly costly and burdensome, invaders not only change their words but also their deeds, for example privileging indirect intervention or including in every interventionary event a democratic agenda. Long ago, a legal scholar stated that ‘it is seemingly easier to evoke aggression than to dispel it, and easier to commit aggression than to define it. What has been universally condemned as ‘the gravest of all crimes against peace and security throughout the world’ has yet to be consensually particularized’ (Ferencz 1972). At least in the legal field, this dismal conclusion still holds.

The concept of intervention is related in quite a complex form to other ones such as aggression. ‘Invasion’ is a term that is semantically surrounded by other terms and concepts that are not quite synonyms: ‘war’, ‘imperialism’, ‘international incident’, ‘military aid’, for example. It is very clear that there is a dense interconnection between all the elements of this web. Furthermore, there is an affinity between intervention and military aid: should countries that get huge levels of aid from another be considered ‘intervened’ or not? Whatever the answer, it should be consistent.⁴ The problem has already been noted by Rosenau, Regan and others. As Rosenau (1964: 153) remarks:

Often intervention is defined in such a general way that it appears to be synonymous with imperialism, aggression, colonialism, neocolonialism, war, and other such gross terms that are used to designate the noncooperative interactions of nations. One observer, for example, finds it useful to define imperialism in terms of ‘action that ... are intrusions into the affairs of another people’, a definition which is hardly differentiable from the view that ‘intervention’ refers to conduct with an external animus that intends to achieve a fundamental alteration of the state of affairs in the target nation... Nor is noncooperative animus necessarily considered to be a characteristic of interventionary behavior. Foreign aid programs have been classified as intervention, and, to the distress of some international law specialists, so have collective security measures taken by several nations to protect their common interests.

‘Type B’ Problems

We start by revisiting the problem of multidimensionality. Not only does finding the adequate level of aggregation require a ‘delicate balance’; there are other quite fundamental issues that have not been addressed by the literature, and that even the most sophisticated criticisms to existing databases have still not fully captured. The first one is the problem of aggregation from the point of view of the logical operators used to ‘flatten’ the concept from many dimensions to one. In other terms, not only the level but also the type of aggregation is an issue. If there is definitional dispersion in the field (in the sense that each researcher has his or

⁴ Existing databases appear to violate this minimal condition, classifying some forms of aid as intervention and ignoring others. For example Colombia appears invaded in 1989 (by the United States) in Regan (2002). Why in this year and not in others? Cuba is invaded in 1978 (by the Soviet Union) in Pearson and Baumann (1993); Tanzania, 1964 in Tillema (1991) and Pearson and Baumann (1993). Idiosyncratic codification would seem to invite all kind of biases and inconsistencies.

her own version of what an invasion is, and that this has a potentially big impact on measurement), aggregation dispersion (in the sense that each author uses different logical operators, almost never explaining why) is even more eminent. A glimpse of this is captured in Table 2.

In Table 3, we analyse 67 different journal definitions of invasion from a formal point of view. In column 1 we put the number of criteria, in columns 3 to 6 the operators used to aggregate them, and in column 2 the number of definitions (from the universe of 67) that fit this description. For example, row 1 indicates the definitions that used only one criterion; naturally, they do not use any aggregation operator. In the second and subsequent rows come the definitions that use two criteria; naturally, they can use only one aggregation operator. Row 2 captures the definitions that use two criteria and aggregate them with an AND. The majority prefer the broader OR rather than the more restrictive AND. There are 15 papers that opt for pure ANDs, 18 for pure ORs and 12 for a combination of both. Typically, in this corpus of papers not once can there be found a reflection of why one or another combination of operators is adopted. Yet this is crucial, and can be visualised through the following simple exercise. If we applied the Rosenau definition with an AND (as the author proposed) or with an OR, to the main existing databases, the variation is very big (Table 4). In Pearson and Baumann (1992), of their 667 reported cases, using Rosenau's definition with an OR we would get also 667, and with an AND 532. Regan (2002) – who explicitly bases his coding in Rosenau's definition – counts 551 cases of military intervention (he includes also economic intervention). Using a Rosenau's OR only applied to military events would circumscribe his universe to 429, and an AND to 363. The count for Tillema (1991) is 469 with an OR and 254 with an AND. Simply stated, the use of different aggregation operators fully determines the result of the coding procedure.

Table 3: Types of classification in the literature (67 definitions)

# of criteria	# of definitions	AND	OR	MAX	Non interpretable
1	13				
2	5	X			
2	14		X		
2	1			X	
3	10	X			
3	4		X		
3	4	X	X		
3	1				X
4	3	X			
4	5	X	X		
5	2	X	X		
5	1	X	X	X	
Difficult to specify	5				X

Source: Papers from the following journals: International Security, Vol. 5 (1981); Vol. 20 (1995). American Journal of Political Science, Vol. 32 (1988); Vol. 47 (2003). Journal of Peace Research, Vol. 29 (1992); Vol.38 (2001), Vol. 17 (1980), Vol. 26 (1989), Thesis Univeristy of Maryland (2004), The Journal of Conflict Resolution, Vol. 39 (1995); Vol. 43 (1999); Vol. 6 (1962); Vol. 27 (1983); Vol. 40 (1996); Vol. 44 (2000); Vol. 34 (1990); Vol. 39 (1995); Vol. 40 (1996); Vol. 15 (1971); Vol. 13 (1969); Vol. 32 (1988), The American Journal of International Law, Vol. 97 (2003); Vol. 89 (1995); Vol. 92 (1998); Vol. 74 (1980); Vol. 39 (1945); Vol. 51 (1957); Vol. 82 (1988); Vol. 69 (1975); Vol. 94 (2000); Vol. 48 (1954); Vol. 86 (1992); Vol. 83 (1989); Vol. 95 (2001). World Politics, Vol.18 (1965); Vol. 32 (1980); Vol. 34 (1982); Vol. 21 (1969); Vol. 44 (1992); Vol. 20 (1967); Vol. 42 (1990); Vol. 26 (1974). International Security, Vol. 23 (1998); Vol. 21 (1996); Vol. 2 (1977); Vol. 8 (1983). American Journal of Political Science, Vol. 47 (2003); Vol. 35 (1991). The Journal of Political and Military Sociology (2001). Journal of the Nordic International Studies Association, Vol. 37 (2002). Military Affairs Vol. 39 (1975). Political Behavior, Vol. 20 (1998). ECPR Joint Sessions of Worlshops (2004). Thesis Uppsala University (1986).

Table 4: The Rosenau definition with an AND or with an OR

	Pearson & Baumann 1992	Regan 2002	Tillema 1991
No. cases	667 cases	551 cases (132 economic intervention and 429 military intervention)	469 cases
OR cases	667 cases	429 cases	469 cases
AND cases	532 cases	363 cases	254 cases

Second, when reducing a concept from a multidimensional world to a one-dimensional one, order becomes an issue. Concepts that live in a multidimensional space produce data points that are not ordered, but ultimately a coder needs an instruction to translate them into an ordered set, say of zeroes and ones (or alternatively an ordinal scale), that tells if an event is, or is not, an invasion, and (perhaps) how intensely it corresponds to the concept (its ‘degree of invasiveness’). In effect, while scales ‘live’ in a well ordered world with a clear hierarchy, social scientific concepts are almost always multidimensional. Multidimensional worlds are richer, but are less ordered, than scales. Indeed, there is a whole set of statistical tools and

theories oriented towards the building of correct scales from complex intellectual constructs. Operationally, this has many expressions. First, multidimensional concepts can be made less complex by factorial and principal component analyses, which allow the researcher to see below and beyond an apparently baffling multidimensionality (e.g. Widaman 1993). If this type of reduction of order cannot be achieved, then different forms of aggregation can be considered (starting from Multidimensional Scaling, a tool explicitly thought to address the problem – e.g. Wenstop 1980; Williams and Nigel 2002). Last but not least, approaches such as structural equations allow the researcher to incorporate multidimensionality directly into the model, assuming that the complex concept is a ‘latent variable’ expressed by other, explicit ones (e.g. Bollen 1989). But none of these techniques fully solves the specific problem of social scientific databases, partly because none of the above techniques guarantees full reduction to a single dimension.

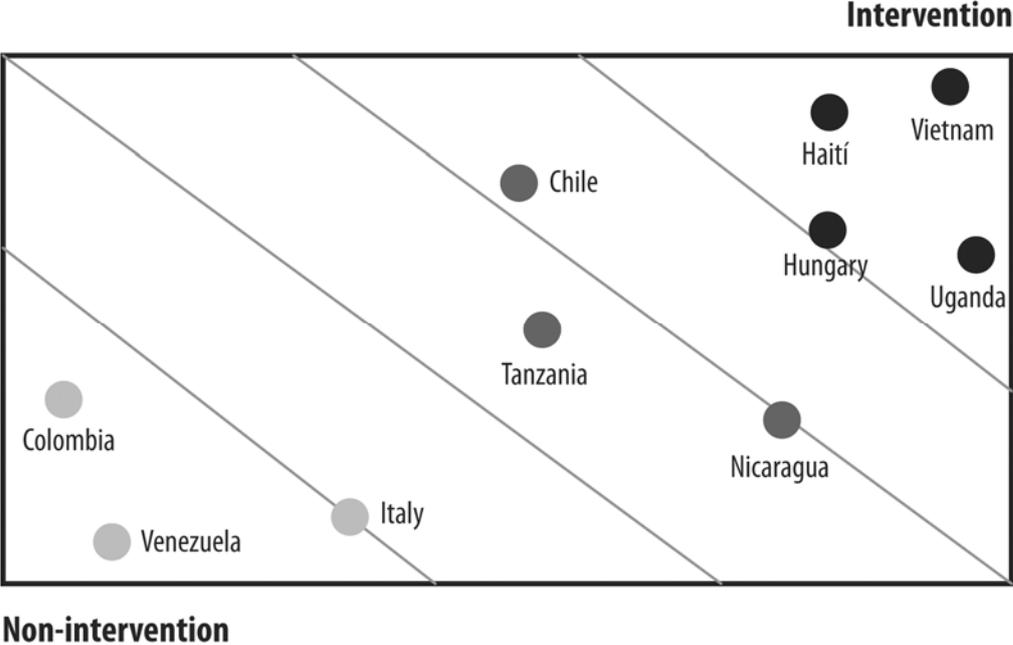
But by far the main complication is that the imposition of complete order may be a quite fundamental distortion of the concept. In effect, it is typical of social scientific concepts – in fact, of all multidimensional concepts – that they live in a world where only partial, and not total, order exists. Forcing total order operationally is not only contrived, it also misrepresents the very idea that is trying to be quantified. Any formalism or codification based on the idea that there is an underlying total order assumes a sunken, but generally unwarranted, premise. To take a simple example: in Rosenau’s definition, there are two criteria to classify whether or not an event is an invasion – its tinkering with the authority structure, and its convention-breaking nature. How to compare an event that transforms deeply the authority structure of a country while trying to minimise the breaking of convention, with one that operates the other way round? Correspondingly, in Table 5 we see three different types of real life situation: those that fulfil both Rosenau’s criteria to an eminent degree; those that are only partially authority-oriented; and those that are strongly authority-oriented but only weakly convention-breaking (because they have been fully supported by the UN, for example). While the first category should go into any database, what to do with the other two? And if they are included, how to compare them if they are intrinsically unordered (see Figure 1)?

It should be noted that, as a consequence, the problem of order affects particularly strongly, but not exclusively, those databases that try to arrive at an aggregate, one-dimensional grade. However, it also concerns all those database builders who expect to establish a clear cut-off point between events and non-events, since to establish this one has to suppose total order.

Table 5: Convention Breaking and Authority-Oriented

	Convention -Breaking AND Authority-oriented	Convention-Breaking	Authority- Oriented
Pearson & Baumann 1992	1969-Prague	1981- Peru & Ecuador	1950-Korean War
Regan 2002	1975-Angola		1949-China
Tillema 1991	1963-Cyprus	1979-Chad & Libya	1956- Dominican Republic

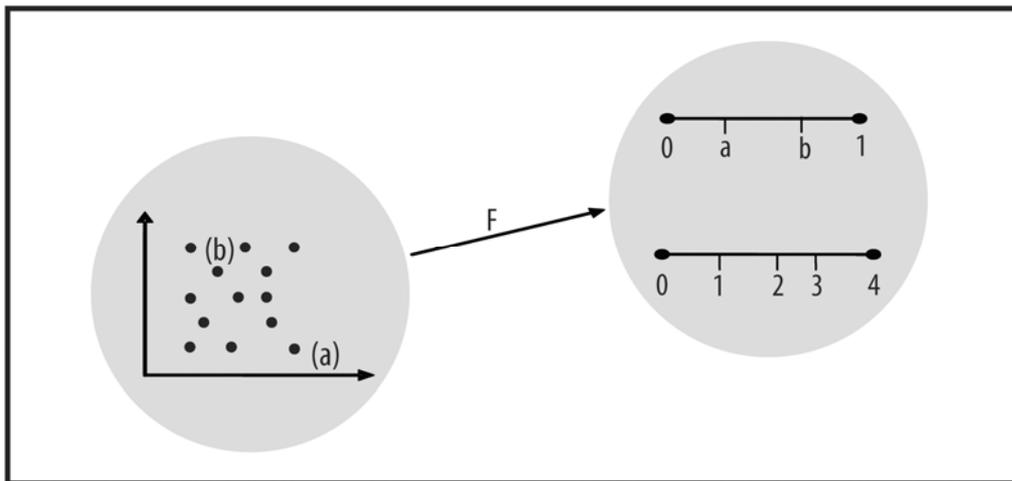
Figure 1: Intervention or Non-intervention?



Source: authors

The supposition that there is an underlying total order in general entails other difficulties. Social scientific concepts tend to be ‘radial’ (Lakoff 1990), in the sense that they are gradual (they ‘fade out’ from a prototype to less typical examples, see Figure 2) and are thus full of grey areas. Multidimensionality and ‘radiality’ are typical of social science concepts. In the interventions field there are several sources of this intrinsic fogginess. First, there is no ‘natural’ cut-off point. Each definition more or less adequately defines what a prototypical invasion is. Different events and situations approximate up to a certain point the respective prototype. Where should we put the line below which an event is no longer classified as an invasion? The definitions certainly give no specific instructions in this regard. What will the coder do with an event that comes very near the prototype in one dimension, but very far in another one? The solution offered by the invasion databases – idiosyncratic AND binary codification – is particularly unattractive. It does not differentiate clearly an event from a non-event, and in regards to the former it collapses very big ones with very small ones. The bombing of a borderline checkpoint, or a hot persecution by a neighbouring country, is counted on the same footing as the Vietnam or the Gulf wars. Somehow, this seems fatally wrong. Including everything in the same mixed bag is a source of confusion; in particular, the myriad of very small events acts as noise in relation to the big, prototypical ones, so the statistical associations that are found (or rejected) are predicated on a universe very far away from the prototype that was supposed to be analysed in the first place (big, canonical interventions). For example, as seen in Table 4, using Rosenau’s more stringent AND aggregation operator, the number of events from each database is cut by a factor of almost two. There is as much noise as information. It is quite clear that no statistical analysis performed over this universe of events is speaking about what happens near the prototype. Introducing a yardstick to measure the ‘degree of invasiveness’ (or, if preferred, the degree of the similarity of a given event to the prototype) would have allowed researchers to differentiate events from the point of view of their size and weight.

Figure 2: Function R^2 – Non-ordered



Note: the classificatory exercise needs a function that goes from R^2 – non-ordered world to an ordinal scale where total order exists (for any two events A or B, you have $A > B$, $B > A$ or $A=B$).

Source: authors

Basic social scientific concepts are not only ‘radial’, they are also verbal in nature (or ‘linguistic variables’, Yen and Langari 1999). By this we mean that they are full of linguistic hedges, modifiers that speak about the degree to which a condition is fulfilled. You can see that the operational Rosenau (1969) definition is plagued by linguistic hedges (we italicise them): ‘Two characteristics are *usually* associated... *although the association is often left implicit ... seem inclined to belief... sharp* break with then-existing forms...’.⁵ How do you know that an implicit relation has been correctly identified? When do you know something is sharp or blunt? But such vagueness is not the product of some lack of dexterity by Rosenau: it is the social scientific common ground.

It is very difficult to come across a social scientific definition that is not multidimensional, radial and heavily hedged. The combination of these three characteristics – when it is inevitable – we call ‘intrinsic ambiguity’. We do not claim that intrinsic ambiguity makes quantification impossible; we claim, instead, that – when it is present – hardly any model that fails to take it seriously is plausible. Lack of plausibility stems from: a) issues related to aggregation operators (the use of different operators yields widely different results); b) issues related to an uncalled for and hidden assumption of total order, when the original concept that wants to be operationalised only establishes partial order; c) issues related to vague cut-off points, that leads to contrived and *ad hoc* solutions; d) issues related to the linguistic, hedged nature of social scientific definitions, that inevitably (at least in the general case) includes in the concept modifiers that express subjective evaluation of degree (for example, degree of similarity to a certain prototype, or intensity in which a phenomenon is present in an event).

⁵ The same can be said about the definitions that guide the construction of the three major databases. See Table 2.

Conclusion

Quantitative cross-national research is here to stay. Not only is technological conservatism intellectually wrong, it is also simply unviable. However, quantitative investigations have to face a troubling tension. On the one hand, probabilistic models have become ever more sophisticated and abstruse, but on the other hand database building remains as flimsy as ever (perhaps increasingly so). Modellers have a lot to say about nuances of correlations, but frequently they cannot specify correctly what phenomena they are trying to correlate. Researchers have not as yet fully identified and understood all the sources of this tension, nor have they extracted from it the necessary conclusions.

Counting is important – but counting what? While in some delimited areas – for example, electoral time series – this kind of question is marginal, in many other ones it is central. In this paper, we saw that database building in the field of invasions – dealing with a relatively clear cut, identifiable, phenomenon, and exhibiting a much better tradition than many other ones in tinkering with definitional niceties – is affected by two classes of problems: conceptual dispersion and unsolved tradeoffs (Type A), and intrinsic ambiguity (Type B). Marginal improvements within the same conceptual universe can help to patch up some of the issues raised by Type A. However, if we are right, Type B cannot be dealt with in this fashion: vague boundaries, radiality, linguistic hedges, lack of total order, are intrinsic to social scientific reasoning. In database building, we would do better to resort to existing formalisms that allow us to explicitly model this type of uncertainty (Yen and Langari 1999; Pfeilsticker 1981), instead of trying to achieve some kind of spurious clear cut precision. The dilemma of indulging in a wholesale rejection of quantification, or simply ignoring ambiguity, can and should be solved by taking it fully on board.

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