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An Elementary Theory of Social Structure

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Abstract: This paper gives an overview of the Elementary Theory, a theory which infers interests from conditions of social structure and uses that information to predict interaction outcomes. It also reviews how the theory models social structure and the seven conditions of structure (i.e. exclusion, inclusion, null, inclusion-null, inclusion-exclusion, hierarchy/mobility and ordering) known to affect one type of human activity, the exercise of power. This paper ends up with a brief presentation of the recent theoretical developments of the Elementary Theory.

Keywords: *Elementary Theory, exchange relations, power exercise, social structure, structural conditions.*

Elementary Theory (hereafter ET) predicts human activity in social structures. According to ET, the effect of social structure on activity is not direct. Rather, social structures imbue social relations with possible interaction outcomes that are valued by actors. As actors enter relations, they pursue those outcomes, called interests, and thereby structure affects activity (Willer and Anderson, 1981; Willer, 1987, 1999). ET infers interests from conditions of social structure, and uses that information to predict interaction outcomes.

Elementary Theory is not alone in asserting that interests are contained in social structures. For example, Weber's 'official' pursues interests that are inherent to bureaucracies ([1918] 1968) and for Marx ([1867] 1976), workers pursue interests inherent to the economy. However, while the theories of Marx and Weber are difficult to test, scholars have rigorously tested ET's predictions under controlled conditions. Indeed, data from numerous

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experiments strongly support ET predictions (Willer and Szmatka, 1993; Lovaglia et al., 1995; Emanuelson, 2005; Willer and Emanuelson, 2008).

Nor has Elementary Theory been relegated entirely to the lab. The theory's models have been applied to explain activity in an array of political and economic structures, both contemporary and historical. For example, Elementary Theory has been used to explain the exchange of favors in modern Dutch artisan communities (Hansen, 1981), patterns of military aggression in ancient Rome (Willer et al., 1996), and the development of socio-political complexity (Willer and Emanuelson, 2010).

The significant breadth of ET makes it difficult to discuss the theory in its entirety here. So, this discourse will discuss only a few of the theory's core contributions. In particular, the discussion will briefly review how the theory models social structure and the seven conditions of structure known to affect one type of human activity, the exercise of power. To conclude the discourse, recent theoretical developments will be introduced.

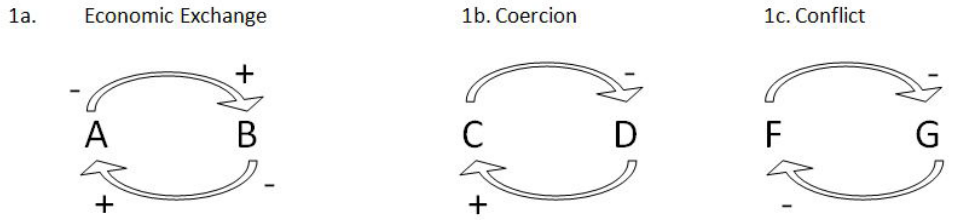

Figure 1: *Three social relations*

Modeling

To construct its understanding of social structure, Elementary Theory builds relations that are abstract and fully general. To start, the theory constructs simple models, and then combines those models to capture more complex phenomena. On a micro-level, signed arcs connect actors in social acts called sanctions. Sanctions are differentiated by the effect that the act has on the recipient. For the recipient, positive sanctions produce desired outcomes while negative sanctions produce adverse outcomes. To represent social relations, sanctions are paired. For example, in Figure 1a, the paired positive sanctions linking A and B represent an economic exchange relation. Figures 1b and 1c represent a coercive and a conflict relation respectively. On a macro-level, social structures comprise two or more connected relations. The exchange structure of Figure 2 has four actors and three exchange relations.

Predicting Power Exercise

A large portion of ET focuses on predicting power exercise. In the exchange relation of Figure 1a, A exercises power over B if A benefits at B's expense. For example, a powerful employer can pay a minimal salary to the detriment of their employees while powerful employees can demand large salaries at

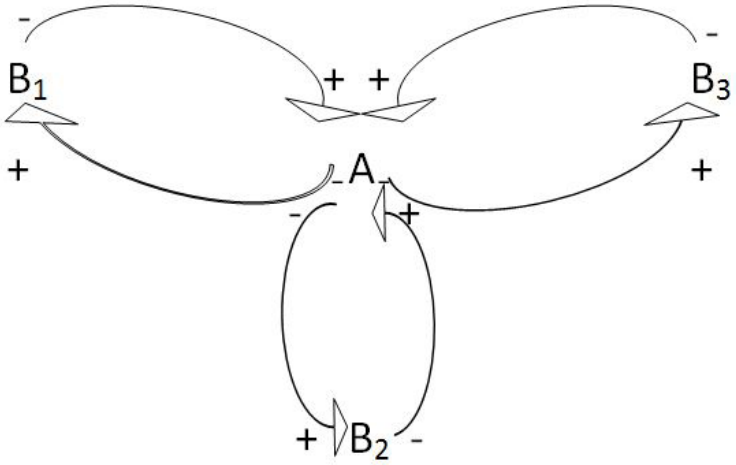

Figure 2: *Economic exchange network*

significant expense to their employer. For Elementary Theory, an actor is powerful when they occupy powerful positions in relations that contain the potential for power exercise.

The potential for power exercise exists in mixed motive relations. A relation is mixed motive if actors in the relation have interests that coincide and interests that diverge. For example, in the economic exchange structure of Figure 2, A's interest in reaching agreement coincides perfectly with B_1's. The reason being, they both benefit if they exchange. However, when negotiating the terms of agreement, A's and B's interests are in perfect opposition. A's gain in the negotiation is B's loss and vice versa. Examples of mixed motive exchange relations include wage negotiations between employers and employees and market transactions between buyers and sellers. In both circumstances, all parties prefer agreement to confrontation, but are at odds over the exact terms of agreement. To capture actors mixed motives, ET uses Resistance.

Resistance equations balance the actor's interest in receiving the terms most favorable to self (Pmax – P) against the actor's interest in avoiding confrontation (P – Pcon), where P is the actor's payoff at agreement.

$$R = \frac{Pmax - P}{P - Pcon}$$

For example, assume that DVD x is worth, at most, $36 and that the $ is not divisible. Then, x's maximum price is $35. If seller A cannot agree on a price with consumer B, A gains nothing. A's resistance to demands made by B will take into consideration the maximum possible payoff, $35 and the result of confrontation, $0.

$$R_A = \frac{35 - P_A}{P_A - 0}$$

Elementary theory asserts that actor A and B will agree when A's resistance is equal to B's. Assume that A and B are in a dyad. Inferring A and B's resistance:

$$R_A = \frac{35 - P_A}{P_A - 0} = \frac{35 - P_B}{P_B - 0} = R_B$$

Solving, $P_A = 18$ and $P_B = 18$. That is to say, B saved $18 and A received $18. In an exchange dyad, neither actor is advantaged by the structure. But, when the exchange relation is part of a larger social structure, conditions can advantage some actors at the expense of others. That is to say, conditions of structure can create circumstances whereby actors in advantaged positions can better resist demands than actors in disadvantaged positions.

Structural conditions

Elementary Theory recognizes seven conditions of social structure. The five types of connection are exclusion, inclusion, null, inclusion-exclusion and inclusion-null. Variants of exclusion and inclusion are hierarchy-mobility and ordering respectively. In addition, the theory has conceptualized three distinct network types that contain exclusion: strong, equal and weak.

To define types of connection, Elementary Theory uses a simple system of classification. N_A is the number of relations connected at actor A, M_A is the maximum number of agreements from which A can benefit and Q_A is the minimum number of agreements necessary for A to benefit.

Exclusion

If $N > M$, the structure contains exclusion. Referring to Figure 2, assume A can sell DVD x to only one of the three Bs. Since $N_A = 3 > M_A = 1$, at least two Bs must be excluded from exchange. In this structure, A is high power. High power positions can take all value in a relation except the smallest lump unit. For example, if the value of x = $35, P_A = $34 leaving $P_B = \Delta$ = $1. Why? Because A's cost of confrontation is much smaller than each Bs'. Consider the consequence of not reaching agreement for each actor. If A and B_1 do not agree, A can accept B_2's or B_3's offer; $P_A con > 0$. In contrast, having no alternative to A, $P_B con = 0$. To avoid receiving $0, Bs compete to make the best offer to A. As interaction continues, $P_A con$ increases, which is to say A's costs of not reaching agreement decrease. As a consequence, A is better able to resist demands from Bs. This process continues until $P_A = P_A max$.

The Figure 2 structure is strong power. Strong power structures have high power positions that are never excluded connected to two or more low power positions at least one of which must be excluded. That exclusion can have a potent effect on interaction outcomes has long been known. For example, exploitation of workers can be extreme when workers are separated from the means of production (Marx [1867] 1976), and officials are weaker when separated from the means of administration (Weber [1918] 1968). But, the effects of exclusion are not always extreme.

In equal and weak power networks, the effects of exclusion are attenuated. In equal power networks, positions cannot be distinguished except by label. As such, each actor's likelihood of being excluded is equal to every other actor's. Since structure advantages no position, actors' payoffs are equal.

Weak power structures contain exclusion, but are neither strong nor equal (Markovsky et al., 1993). Positions in weak structures face different likelihoods of exclusion. Advantaged

positions face a lower probability of being excluded than disadvantaged positions. Payoffs to positions in weak structures range between values for strong and equal networks. Considerable work has been done to adjust resistance equations to predict payoffs in weak power networks (Willer, 1999; Emanuelson 2005).

Inclusion

Looking at Figure 2, if $Q_A > 1$, A is disadvantaged by inclusion (Patton and Willer, 1990). Imagine that director A must hire actors B_1, B_2 and B_3. If one or more of the actors refuse employment, the director cannot complete the film. Stated abstractly, $Q_A = 3 > 1$. Now, assume that A exchanges first with B_1, second with B_2 and third with B_3. In the first exchange, $P_A con = P_B con = 0$ so $P_A = P_{B1}$. In A's second exchange, A will lose gains from exchanging with B_1 if A cannot reach agreement with B_2. Since, $P_A con < 0$ and $P_{B2} con = 0$, A's resistance is weaker than B_2's. B_2 is more powerful than A. For each exchange A completes, A's cost of confrontation increases. As such, A is weakest in its last exchange.

Null

In Null connected structures, N = M and Q = 1. When structures are null connected, activity in the structure mirrors activity in the dyadic relation. No actors is advantaged, or disadvantaged by conditions of the structure.

Inclusion-null and Inclusion-exclusion

Where $N_A = M_A > Q_A > 1$, A is connected by null and inclusion. Under these conditions, inclusion does not disadvantage A. Rather, A's resistance is determined by its null connection. For example, if director A wants to hire all three actors, B_1, B_2, or B_3, but he only needs to hire two, A is inclusive-null connected. That A could exclude one of the Bs, effectively masks any effect of inclusion and equal agreements are reached in each of the three exchanges.

Now, if A needs and can hire only two actors, $N > M \geq Q > 1$ and A is connected by inclusion-exclusion. Under these circumstances, one of the three actors, B_1, B_2, or B_3, will not be hired. As the Bs compete to be hired, negotiations start to strongly favor A. Inclusion is effectively invisible, and agreements reflect distributions found in exclusively connected relations. That is, payoffs are extreme favoring A.

Variants of Known Structural Conditions

Hierarchy/mobility is a variant of exclusion. In hierarchies, if actors prefer higher positions to lower positions and supervisors promote subordinates by evaluating their level of obedience, actors at each level will compete to be the most subservient to their supervisors. As actors at each level compete to be upwardly mobile, control will flow to the top of the hierarchy. Ultimately, it is the goals of the actor occupying the top-most position that are pursued throughout the entirety of the hierarchy. Importantly, it is not hierarchy itself, but rather the competition for a limited number of valued promotions that centralizes power. In hierarchal organizations where promotion is determined by political affilia-

tion, nepotism, racism or other types of favoritism, competition is undermined and obedience is not maximized.

Ordering is a variant of inclusion. Ordering occurs when agreements are reached in a given sequence. Like inclusion, ordering disadvantages the position for whom Q > 1. Whereas in negotiations, inclusively connected actors take into consideration the loss of prior investments, actors connected by ordering take into consideration the potential loss of future profit. Thus, the resistance of actors connected by ordering is lowest in the initial exchange. Positions advantaged by ordering, called gatekeepers, extract fees from clients in return for granting access to valued relations (Corra and Willer, 2002). For example, citizens seeking access to court frequently seek out and give 'favors' to patrons, patients must first pay doctors to access desired medications and students pay college tuition for years to gain access to desired jobs.

These seven structural conditions and three network types are the basic tools used by ET to predict activity in social structures. However, by no means are they the theories only instruments of analysis. Elementary Theory has continued to expand its scope by creating new derivations and applying its models to an increasing array of social structures.

Advances in elementary theory

Through the interconnected process of invention, discovery and testing, the theory continues to experience significant growth in precision and scope. No longer is ET limited to predicting activity for 'undifferentiated actors' (Willer and Anderson, 1981). Now, ET predicts the effect of structure on the interaction between high and low status actors (Thye et al., 2006), as well as the interaction between pro-social, individualist and competitive actors (Willer et al., 2013). Nor is ET restricted to the study of static structures. Willer and Willer (2000) examined structures wherein actors can dissolve relations and form new relations. Furthermore, numerous studies have examined, not only the conditions affecting the formation of coalitions, but also the effects of those coalitions on interaction outcomes (Walker and Willer, 2007; Simpson and Macy, 2001; Simpson and Willer, 2005; Borch and Willer, 2006). To explain how power extends beyond adjacent positions to encompass actors in distant positions, ET conceptualized a new type of network, the flow network (Willer, 2003; Willer and Emanuelson, 2006) and seeking to extend the application of the theory to large structures outside the lab, the theory recently developed an analytic method for breaking large structures into smaller domains (Willer et al., 2012) Also, the effects of extra-structural conditions like actors' knowledge (Emanuelson and Willer, 2012) and frequency of interaction have been theorized, and predictions have been generated and tested (Emanuelson and Willer, 2009). Strategic Analysis, an extension of ET, extracts decision games from conditions of social structure, then applies game theory to generate predictions (Willer and Skvoretz, 1997).

Although ET has expanded greatly over the last three decades, the theory still has significant room for development. So far, much of the research has

focused on exchange structures. But, conflict and coercive structures are just as prevalent, if not more so. Elementary Theory would benefit from new research examining the effect of structural conditions on coercive and conflict structures.

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