The Prealgorithmic Basis for the Mechanization of Face-to-Face Interaction

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Like an antique of discovered in an attic, the present piece is from an earlier period and may have value that has gone unrecognized. It is a never-before-published manuscript estimated to be between 25 and 30 years old that seems strangely appropriate for publication as a Technical Report at this time.

Great gains have been made in artificial intelligence over the past 25 years, but not on the problem considered herein: how to create a mechanized social actor. IBM's Watson, the "question answering" machine written-up in the June 20, 2010 New York Times Magazine, may play a great game of "Jeopardy," just as Deep Blue plays a great game of chess, but it is not out to pass the Turing Test. Passing the Turing Test is, of course, the quintessential criterion for machine intelligence. But is the "imitation game" too low a bar? Would a computer that is successful at masquerading as a person in the role of interrogation respondent be equipped to get along as a teacher, a doctor, or babysitter? This paper deals with the issues there.

In addition to addressing an open problem, this paper is au currant in the sense of being interdisciplinary. It appears to tie-in social psychology, mathematics, and computer science. Perhaps its ideas are promising enough to spark associations for new work. If the present paper is thought of as a work in progress (albeit one held in suspended animation for considerable time), then it is a fit contribution to the Technical Report series.

Allen Stix, Editor

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The other two authors were Pace students in the early 1980s.
Representing Face-to-Face Interaction

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Note: The figures referred to in the text may be found on pages 42-52.
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Abstract

Computer technology and supporting realms of artificial intelligence have advanced to the point where the construction of programs capable of simulating human participation in face-to-face interaction will soon become an irresistible challenge. The success of such efforts will depend upon the validity with which underlying models articulate the formal features of social conduct.

Herein, sociological theory is distilled for just those logical structures essential for casting models of humanlike social participation upon which simulations may be built. Two approaches to representing the elements involved in social interaction as well as the intrinsic structural complications are presented: One is diagrammatic and the other is machine tractable.

[105 words]
The Prealgorithmic Basis
for the Mechanization
of "Face-to-Face" Interaction

I. Introduction

ELIZA, Joseph Weizenbaum's program for mimicking a Rogerian
psychotherapist (1966), raised the tantalizing prospect of software for enabling the machine to interact with human beings in a thoroughly humanlike way. ELIZA's input consisted of sentences in unconstrained, continuous English from a person assuming the role of a "client" on the initial session. Her output consisted of responses seeming to embody an understanding of the client's feelings and problems along with, on a more general level, an astute professional ability to query in order to enhance clinical efficacy.

As remarkable as ELIZA seemed, she was a fraud. Her apparent perspicaciousness was a facade wrought from rules akin to the collection of simple-minded ploys a comedian might use to mock the clinical procedure. Moreover, she contributed almost nothing of value to the serious, theoretical quest for mechanistic principles underlying the general capability for automated social interaction.

At the time of ELIZA's inception little more along these lines could have been implemented. Today, however, we seem to be approaching a threshold where it may be possible to build programs with capabilities closer to those ELIZA could only pretend
to possess. Roger C. Schank's trailblazing success in the representation of understanding of what goes on within social institutions (i.e. "scripts"), the succession of institutional involvements required for a person to accomplish a specific objective (i.e. "plans"), and the general motivations behind choices of objectives (i.e. "goals") is a major reason for optimism (Schank & Abelson, 1977). Schank has provided a means for tracking the flow of activity within the contexts of life ensconcing all face-to-face encounters. Another reason for optimism is the evolution of new, very-high-level programming languages, specifically SETL, which provide facilities for describing and operating upon sets and setlike structures (e.g. tuples, which are ordered sequences of arbitrary elements)(Dewar Schonberg & Schwartz, 1981). The formal nature of face-to-face interaction, which has been long understood by sociologists and which is what this paper reviews from the perspective of its potential computerization, can be expressed with precisely the data structures available in SETL.

The goal toward which this paper is directed is the capability to produce software that would permit almost any part in any type of face-to-face encounter to be enacted mechanistically with a facility for managing all standard interpersonal complications. This needs to be unpacked for its full meaning to be appreciated. Consider ELIZA. The type of face-to-face encounter for which ELIZA was fashioned was the psychoanalytic interview. No amount of modification would have rendered her formal
edifice adaptable to an encounter at a restaurant, birthday party, or automobile showroom. Not only was ELIZA formally unsuited for other settings, but she could not have been adjusted even to undertake the part of the client within her native environment, which one might have imagined she "understood" intimately. Furthermore, even in role as the doctor administering therapy, ELIZA was totally unequipped to manage such contingencies as an interruption from a hypothetical secretary or even the client's stepping out of the mode of an immediate recipient of treatment into the mode of a person excusing himself or herself to go to the bathroom. Our objective is to contribute to the accumulation of knowledge about the interpersonal arena that will aid in designing all programs posing as human social participants.

This paper is intended as a forerunning effort to serve as a guide: (1) in devising strategies for the representation of information needed by the machine as a social actor, and (2) in formulating algorithms for the mechanization of role enactment. It explains those constructs identified within sociology for the formal treatment of social interaction and suggests how each of these might be symbolically operationalized.
II. Defining the Concept of Role

The part performed by a person in social interaction is called a role.\textsuperscript{1} ELIZA enabled the computer to enact the role of a therapist. Since the ultimate aim of this paper is the development of a methodology for enabling the computer to enact any role, the first thing needed is a clear explication of what precisely a role is. As it turns out, the concept of role cannot be defined or applied without equally clear explications of the interdependent concepts of norm, status, and institution.

The concepts of norm, role, status, and institution pyramid. The conceptual pyramid can be looked upon either from the atomlike basis of the norm or from the over-arching interpersonal milieu of an institution. Let us define each of these beginning with the norm.

A norm is a standard of behavior or an operatively salient belief (e.g. for the teacher, an operatively salient belief is that students should not cheat on tests). Each individual norm prescribes or proscribes an action or reaction to things, the conduct of others, or events. For the purpose at hand, norms are foundational primitives (see Appendix A for a discussion of the problems posed by identifying and representing norms).

A role is a set of norms which defines how individuals (i.e. social actors) ought to conduct themselves. Since a role is, literally, a set of norms, it can be visualized as such. Referring to Figure 1, each tiny line within the bracket represents a
norm -- a single behavioral "do" or "don't." Formally, the concept of role may be defined as a set of pairs \([ N, k ]\), where \(N\), the first component of each pair, is a norm (i.e. a substantive specificational prescription or proscription) and where \(k\), the second component of each pair, is an integer denoting the norm's rank with respect to the seriousness attached to nonadherence (i.e. the severity of sanctions for violation).\(^2\) The value of

\[
R = \{[N, k] \mid N \text{ is a norm and } k \text{ is an integer}\} \quad (1)
\]

one (i.e. 1) for \(k\) might indicate a norm whose transgression brings the gravest possible consequence. The substantive norms actually constituting each role, and each norm's weightiness, is determined by community consensus (i.e. beliefs held by people in general).

A status is a socially recognized position with respect to the ongoing activity from which certain definite contributions are expected. A social actor's status denotes his or her place with reference to the \textit{ad hoc} sphere of activity. The concepts of role and status directly relate because associated with each status is a distinct conception of what constitutes proper conduct for the status occupant, which is to say the role. Formally, the status-role association may be represented as a pair \([S, R]\) having as its first component a status and as its sec-
An institution is the coordinated activity of a collection of people (i.e. social actors) pursuing some transcending objective. Each actor has a status and performs the associated role. Formally, an institution may be represented as a set of pairs. Each such pair contains, as the first component, a status-role pair, \([S, R]\), and as a second component a designation, \(d\), indicating the number of actors (i.e. individuals) who occupy the respective status (and hence perform the associated role). The second component, \(d\), may be either a positive integer, an asterisk (i.e. *, the closure operator), or a plus (i.e. +, the positive closure operator).

The integer may be used when the ideal typification of an institution requires an exactly fixed number of occupants in a certain status. For instance, the typical college class has exactly one instructor. A game of chess requires exactly two players. The asterisk and the plus are used when the number of status occupants is not an exact number, so displaying a specific integral designation would be misleading. The asterisk denotes the possibility of zero or more such status occupants. A class may
run in perfect order with zero or more visiting students present, zero or more guest lecturers, and zero or more observing faculty members. The plus denotes that at least one such status occupant is mandatory, and that more than one is permissible. An instructor's after-class tutoring session requires at least one tutoree, and more than one would definitely be welcome to attend. The formal representation of an institution, suited to portraying general realizations (i.e. ideal-typical specifications), is equally suited to portraying specific instantiations (i.e. snapshots of actual compositions at particular points in time). In representations of specific instantiations, the d's would all be integers.

To exemplify the concepts of norm, role, status, and institution; consider the supermarket. This time, though, we shall approach the conceptual pyramid from the other end. As an institution, the supermarket consists of a large number of individuals working in an interdependent fashion toward the retail distribution of food for consumption elsewhere. Each person present has a recognizable status: that of shopper, that of check-out person, that of stock boy, that of butcher, that of manager, and so on. The question, "What is your job?" (or, "What are you doing here?") elicits a status as an answer. The observable conduct of each person present can be predicted on the basis of his or her status. If a person is known to be a shopper, then it is not surprising that upon entering the store he or she takes a cart and walks around collecting merchandise. If another is a check-out person,
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he or she can be expected to operate a cash register. Each and every status has a corresponding pattern of behavior deemed appropriate -- the associated role. Were it actually possible to enumerate the welter of single dos and don’ts comprising a role, each of these would be a separate norm. Among the norms comprising the shopper role are proscriptions not to steal, not to collect more merchandise than one can pay for, not to open sealed packages for the purpose of sampling or inspection, not to take items from the carts of other shoppers, and so forth. Other norms permit the shopper to stop and talk with friends, to compare the costs of different brands, to shop at a slow or a fast pace, and to leave the clean-up of a mess that he or she might have made to a store employee.

III. Role Theory

A role will always be construed as a set of norms defining proper conduct for an occupant of a distinctive status. The elements of a role are norms, and the position from which a specific role enactment is appropriate is a status.

The concept of role squares with experience, and it affords a degree of predictive power over conduct. If two individuals are about to enter a classroom and one is known to be the instructor and the other is known to be a student, then a good prediction of their respective behavior in the immediate future can be formulated. The former will walk to the front of the room, bring the class to order, lecture, and so on. The latter will take a
seat, listen, record notes, etcetera.

Role theory grew as conceptual refinements were introduced to improve predictive efficacy. Each refinement either (1) clarified what is meant by a status or a role, (2) dispelled ambiguities implicit in the conceptual linkage between status and role, or (3) explained deviance from normative specifications as a formal consequence following from the structure of role. Each refinement, therefore, enabled a better fit between role as a theoretical abstraction and its actual embodiments. The contribution of this presentation is in the manner in which existing ideas have been synthesized. Hopefully, a foundation is set for developing algorithms for enacting roles.

It should go without saying that the discovery of the norms operatively comprising any particular role is an empirical problem which cannot be addressed through the formal, almost axiomatically related properties of roles which constitute the corpus of role theory and the topic of this paper.

III. 1. Role Fragment and Role Sector

For greatest accuracy in predicting conduct, the set of norms taken for a role definition ought to include as many as possible of the prescriptive and proscriptive specifications which actively govern the behavior of the actor in the ad hoc
situation (see Figure 2). At the same time, this set of norms ought to be as sharply focused as possible, with all specifications not of actual applicability eliminated (see Figure 3).

Both role fragment and role sector enable increased precision in articulating the norms regulating an actor's conduct in a given "here and now."

III. 1. i. Role Fragment

The concept of role clearly exists in connection with (1) occupational statuses (e.g. teacher, secretary, nurse), (2) quasioccupational statuses (e.g. shopper, college student), (3) kinship statuses (e.g. sister, fiancée, aunt), and (4) other institutionally integral statuses (e.g. worshipper at church, dinner guest at the home of a friend). However, because role in its essential sense refers to any distinctively stylized and regularly occurring, hence predictable, course of conduct; even roles only fleetingly performed and associated with inconsequential statuses are recognizable. Consider:

** the role of the person who has just lost money
in a vending machine

** the role of the person waiting to use a public telephone

** the role of the person asking a pedestrian for street directions

Each of these may be called a role fragment and its status a microstatus. Identification of microstatuses allows the behavioral expectations of greatest salience to be invoked for the short duration when role fragments cause the suspension or replacement of norms typically associated with a prevailing status.

III. 1. ii. Role Sector

A role is not really a single set of norms; it is a set of different sets of norms. This becomes evident when trying to zero-in upon the specifications governing the status occupant as he or she interacts with particular "role others" (i.e. individuals in other institutionally recognized statuses). Day care teachers, for instance, have entirely different personae as interactants with co-workers, with parents, and with children. To a co-worker, one might say, "That Jimmy's a monster. I wish his mother would keep him home." To a parent, the same teacher might report, "Jimmy seemed a little restless today. In fact, he had a pretty rough day. Children get like that sometimes." College students have a different persona for fellow students from professors (and professors have a different persona for colleagues
from students). This same phenomenon of multiple persona applies to virtually all sustained roles.

Each different persona is a different (or somewhat different) set of norms; each different persona is called a role sector. The physician role, for example, is composed of a number of different role sectors: the conduct exhibited to patients, the conduct exhibited to nurses, the conduct exhibited to colleagues, the conduct exhibited to drug salespeople, and so on. The people of various statuses encountered within the realm of institutional milieu in which a role must be performed are called role others. Role others for the physician role include patients, nurses, colleagues, salespeople, etcetera. Notice the correspondence: for the performer of a specific role (e.g. the performer of the physician role), a different role sector may apply for each distinct role other. The entire union of role sectors incorporated by a

Insert Figure 4 about here

role is called the role's role set (Goffman, 1961, pp. 85-87). As a point of information, the terms "role sector" and "role set" come from sociological theory. They are not our own, and they must not be construed as literally descriptive of the formal nature of the concepts they designate.
III. 2. Evaluating Role Performance -- Appropriateness, Propriety, and Convincingness

All role performances are not of the same quality. The quality of an actor's (including a nonhuman actor's) role performance is evaluated by contrasting the actual enactment against the ideal-typical set of norms defining the role.

Formally, two types of failings are possible:

Failing One: Role, by definition, is the conduct expected of an actor in a specific status. When a role-status mismatch occurs, the role enacted is not the role associated with the actor's institutional status (or not the role sector that should be manifest with the ad hoc role other) and the conduct is deemed inappropriate. In short, this failure involves an actualization of an ill-formed status-role pair.

Failing Two: Role, by definition, is a collection of norms. Nonadherence to any of the individual prescriptions or proscriptions (or any subset) constitutes a departure from accepted standards of conduct.
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To get a symbolic grip on the failure to adhere to normative specifications, let a stand for an irreducibly small unit of socially significant action (i.e. an atomic unit of behavior salient with respect to the possibility of evaluation relative to normative nonadherence). If action a is consistent with norm N, then a → N and N → a. If action a is antithetical to norm N, then a → Not N and Not N → a.

These two types of formal failings are realized with respect to the discernible dimensions of appropriateness, propriety, and convincingness (Sarbin & Allen, 1968, p. 490).

III. 2. i. Appropriateness

The first formal failing refers to the evaluative dimension of appropriateness. No matter how meticulously a role is enacted, if it is the wrong role then the conduct is errant. Consider the young man mistaken by a customer for a salesclerk. Although a customer himself, he decides, as a prank, to enact the salesclerk’s role. Regardless of how polite, helpful, and informative he may be, this conduct is inappropriate.

The reason all of us are uneasy upon encountering “a familiar face” that we are unable to place is that the appropriate pose is impossible to adopt until recollecting who the person is as a role other (i.e. in what status and capacity we know him or her).

No matter how fine a job the computer does as a Rogerian therapist, if it enacts this role when it ought to be responding
to database queries or delivering electronic mail, its performance is inappropriate and therefore unacceptable.

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Insert Figure 5 about here

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III. 2. ii. Propriety and Convincingness --
Formal Equivalents

The second formal failing is empirically manifest along two structurally identical evaluative dimensions: propriety and convincingness. The difference between these lies in the seriousness of the normative transgression.

A breach of conduct, whether by commission or omission, of the laws, the rules, or the paramount understandings constitutes impropriety. Relative to role $R_{p,q}$ (i.e. the role associated with status $S_p$ as performed before role others of status $S_q$), action $a$ is improper if $a \rightarrow \text{Not } [N, k]$ where the norm's rank, $k$, is sufficiently low. (Recall that the lower the rank the more weighty the norm.)

Noncompliance with one or more of the normative constraints of lesser importance results in a performance which lacks convincingness. Relative to role $R_{p,q}$, action $a$ is not improper but conveys a lack of convincingness if $a \rightarrow \text{Not } [N, h]$ where the norm's rank, $h$, is beyond the confines of propriety but not so high as to be into the realm of role distance. (Role distance is discussed in section III. 4.)
III. 2. ii. a. Propriety

An example of impropriety is a student's cheating during a final examination.

Insert Figure 6 about here

Although the assessment of propriety ostensibly consists of nothing more than a simple comparison between the elemental units of a role's enactment and its ideal-typical specification, rarely is it this straightforward in actual practice. There are at least two complicating caveats.

Caveat 1: Valid assessment, like valid behavioral prediction, presupposes an accurate ideal-typical template against which to compare conduct. Quite often the informal, everyday set of normative requirements for a role differs substantially from the set generally dictated by law, organizational handbooks, or common understanding. For example, from the vantage point of the formal definition of executive conduct, charging personal dining on expense accounts is improper. Informally, this may be condoned by a department's head and constitute standard practice.

Another way in which an inaccurate template may inadvertently come to serve as the basis for assessing propriety is through the use of an overly general ideal-typical specification. Particular ethnic groups, age cohorts, regional sectors, socio-economic locations, and so on may have definitions of a role which differ in essential ways. For instance, the norms defin-
ing proper role performance for husbands and wives differ between the lower and the upper socioeconomic strata. What is more, idiosyncratic prescriptions and proscriptions may prevail locally. Business firm A may demand different conduct from its employees in status $S_j$ from business firm B. Likewise for universities, individual classes, families, and so forth.

This complication is formally manageable by extending the status-role pair, $[S_j, R_j]$, from that of a two-tuple to that of an n-tuple having as the first component a specific status and as the second and subsequent components the various versions of the associated role. Such an n-tuple may be written as:

$$[S_k, 1_{R_k}, 2_{R_k}, ..., n-2_{R_k}, n-1_{R_k}]$$  \hspace{1cm} (3)

and interpreted to refer to the status $S_k$ and the assortment of roles that actors fulfilling this status perform. Role $1_{R_j}$ refers to version 1 of the role associated with status $S_j$. (Actually, of course, each such role $1_{R_j}$ refers to an entire role set. A specific sector, for instance the sector appropriate for role others of status $S_q$, would be denoted $1_{R_{j,q}}$.) An equivalent though perhaps more parsimonious representation consists of continuing to take the status-role pair as a two-tuple, but defining the second component as the set of alternate versions the role is observed to assume:

$$[S_k, \{1_{R_k}, 2_{R_k}, ..., n-2_{R_k}, n-1_{R_k}\}]$$  \hspace{1cm} (4)
Caveat 2: Seldom is there a sharp demarcation between performances in compliance with a norm and performances in violation. In practice, norms are obeyed to a degree, and what constitutes sufficiently close obedience is a subjective judgment. Charging personal dining on one's expense account may be all right if not done too often. A seemingly clear-cut norm of importance governing automobile drivers is the speed limit. However, even this one has a fuzzy boundary. Fifty-five may be the limit, but prosecution for 56 or 57 is highly unlikely. This complication might be handled by representing norms trichotomously, with a marginal area between unequivocal compliance and unequivocal violation.

III. 2. ii. b. Convincingness

A role performance is convincing if it conveys the impression that the actor is fully qualified to function in the status he holds (e.g. that of a serious shopper in a posh and trendy, ultra-expensive, 57th Street boutique), purports to hold (e.g. the swimmer at a public beach who claims to be a physician), or claims to have competence to hold (e.g. a job applicant).

Witnessing a convincing performance, others unhesitatingly believe that the role incumbent is capable of meeting the institutional responsibilities or belongs where he or she is placed relative to the on-going activity. A performance which lacks convincingness is one which fails to corroborate the actor's qualification to maintain the status in which he or she repre-
sents himself or herself. Response to an unconvincing performance may consist of: (1) a vague feeling of uneasiness or of little trust in the individual's capabilities, (2) a conscious but unexpressed suspiciousness, or (3) an active contesting of the legitimacy of the individual's possession or claim to a status.

Convincingness depends upon the display of the numerous ancillary aspects of performance and qualities ordinarily associated with the ad hoc role. The term qualities is used pur-

Insert Figure 7 about here

posely since ascribed characteristics, which are normative concomitants in the sense of statistical modality, enter into convincingness along with facets of conduct. The myriad little things enhancing or detracting from convincingness may be grouped into three categories, but only the first is relevant to the mechanization of role enactment: (1) mannerisms, such as how one speaks (including vocabulary as well as knowing what to say and what not to say) and manifestations of knowledgeability and confidence (or a definite lack of these, if such a lack is supposed to be part of the role)(see Appendix B for a discussion of why an often quoted session with ELIZA conveys a remarkable degree of convincingness); (2) physical appearance, including dress, bodily condition, and apparent attention to matters of hygiene and cleanliness as well as age, sex, and race; and (3)
the place and circumstances under which the status claimant is observed (this contributes to forming an impression of whether or not the person has the physical, mental, or moral characteristics commonly held as part of the role).

The most frequent actually encountered problems connected with role convincingness are difficulties in the adroit enactment of role fragments. A father may have to enact the fragment of an outraged disciplinarian upon having his five-year-old daughter report that her kindergarten teacher is a "*#&@." Despite his amusement with the pride she obviously takes in her advanced vocabulary, evident by the gleam in her eyes, and his knowing that she has absolutely no comprehension of the meaning or foulness of her utterance; he realizes that the slightest suggestion of anything other than extreme displeasure may encourage an untoward repetition. Maintaining an austere facade, which is to say a convincing performance, may be tough. A hostess may have to enact the fragment of a grateful gift recipient when a house guest brings a present. Even if she is totally unenthusiastic, she tries to put up a counterance of appreciation.

III. 3. Structurally Intrinsic Deviance

Deviance refers to conduct antithetical to the role's norms.

There are some obvious reasons why a machine programmed to enact a role may perform deviantly. System failure would put an abrupt halt to processing, causing improper nonresponsiveness.
System overload could slow response time to the point where convincingness is jeopardized. A role specification missing a norm (or norms) of salience would cause action inconsistent with expectations held by the human role other (or the human role others). A role specification incorporating constraints that are not actually applicable will also result in a marred enactment.

The first two sources of deviance are beyond the scope of role theory; they are strictly hardware or operating system problems. The second two are prosaic software problems of no abstract concern; a reasonably complete and accurate enumeration of the norms is a presumable role theoretic given.

Beyond these, there are structurally rooted sources of deviance intrinsic to the formal nature of roles. Similar to those capricious exceptional cases that all programs must contend with, these are likely to prove to be the cause of most of the potential problems in programs built to enact a role. Each entails a dilemma over which of two contrary but seemingly equally applicable norms (or sets of norms) should be manifest at a specific time. Means for gracefully handling these sorts of predicaments will have to be planned in engineering algorithms for synthetic social participation. Three sources of formally rooted normative indeterminancy of relevance in the mechanization of role performance will be examined.
III. 3. i. Role Strain

A role consists of a set of norms. Ideally, the simultaneously applying behavioral specifications are mutually consistent. Adhering to any one ought not prevent adhering to any other. In actuality, however, a role may contain contradictory dictates. One of its norms may be directly antithetical to another, specifying exactly the opposite course of conduct; or, one of its norms may be indirectly antithetical to another, specifying a course of conduct that unfolds to produce results incompatible with the other's dictates. At junctures where the incompatible norms are actively in effect, the actor is caught in a structural bind. Conscientiously adhering to one boomerangs as dereliction of duties as delineated by the other.

Insert Figure 8 about here

Problems confronting the actor because a role simultaneously requires divergent courses of action are problems of role strain. If the actor adheres to norm \( N_i \) and \( N_j \) excludes the possibility of adhering to norm \( N_j \), then the conduct is deviant with respect to \( N_j \). The potential for role strain is rooted in the role itself and will not be eliminated unless the set of norms comprising the role is modified (Merton, 1976, pp. 3-105).\(^4\)

Formally, the potential for role strain exists in role \( R \) if the norms of \( R \) specify both action \( a \) and action \( \neg a \). Symbolically, for norms \( [N_i, s] \) and \( [N_j, t] \) in role \( R \),
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\[(\boxed{N_i, s} \rightarrow a) \land (\boxed{N_j, t} \rightarrow \text{Not } a)\]

This may be reexpressed as

\[a \rightarrow (\boxed{N_i, s} \land \text{Not } \boxed{N_j, t})\]

meaning that act a is at once consistent with normative specification \(\boxed{N_i, s}\) and with the obverse of specification \(\boxed{N_j, t}\). Obviously, then:

\[\text{Not } a \rightarrow (\text{Not } \boxed{N_i, s} \land \boxed{N_j, t})\]

The strain becomes more intense as the values of s and t become lower and their difference approaches zero.

An example involves the role of the greenskeeper at an expensive, private country club. One norm demands unobtrusiveness (i.e. never to interfere with the golf of the members). Another norm dictates responsibility for the health and beauty of the golf course itself. Role strain is manifest on a hot, sunny, mid-July Saturday which brings an unbroken succession of foursomes. If the greenskeeper interrupts the players to water the lawn, he or she is in violation of the one norm. Yet, if the lawn is not watered and, inevitably, it burns; then he or she has violated the other. By the end of the day, no matter how ardently the greenskeeper wants to please everyone, someone will be dissatisfied.

Most roles embody the potential for role strain. A young woman must display an approachable, engaging manner to her boy-
friend's friends, lest she seem cold and snobbish. However, she
must not appear to be courting their affections. A teacher
should encourage students to experiment with ideas and instill a
liking for the subject, for school, and for learning itself.
However, he or she must constantly challenge their intellects,
insist on deadlines, test, and penalize for insufficient
achievement. All of this creates anxiety which has the opposite
effect. A very common source of role strain results from the
constraints of time pitted against the requirements for thor-
oughness and quality.

III. 3. ii. Role Dissensus

A role is a clearly defined, collectively endorsed set of
norms. The actor is beset with a problem when the role others
are rigidly and sharply divided on what constitutes propriety.
One socially significant contingent endorses norm N as the speci-
fication required for propriety while another endorses the oppo-
site, Not N. This renders universally acceptable conduct impos-
sible. Difficulties rooted in an inability to satisfy all inter-
ested parties with one's conduct because some regard one line of
action as proper while the others regard an opposite line as
proper are problems of role dissensus (i.e. a dissensus as op-
posed to a consensus exists regarding the normative specification
Formally, a role dissensus may arise in connection with a status associated with multiple versions of the role, \([S_k, 1^R_k, 2^R_k]\), at times when alternate versions impose discrepant demands. If norm \(k,1^N_i\) if from version one of the role associated with status \(S_k\) and norm \(k,2^N_j\) is from version two of the role associated with the same status and these two norms dictate contradictory action, then a role dissensus occurs at points where these norms are salient. In effect, \((k,1^N_i \rightarrow a)\) and \((k,2^N_j \rightarrow \neg a)\), so \(a \rightarrow (k,1^N_i \land \neg k,2^N_j)\) and \(\neg a \rightarrow (\neg k,1^N_i \land k,2^N_j)\).

An illustration is a police officer's quandary over how much force ought to be used in obtaining information from an arrested individual known to be guilty. The Department considers the vigorous application of force to be mandatory; failing to apply it is tantamount to a breach of professional duty. The court considers the same to be a blatant violation of the culprit's civil liberties; applying it virtually renders the officer a criminal. Another illustration involves the role of a Lutheran at a Church social function. Lutherans have never officially approved of drinking in Church. One contingent in the congregation feels that alcohol at Church functions is a defiance of doctrine and therefore improper. Another contingent feels that to flaunt abstention at Church gatherings while drinking at
other social occasions is hypocritical, and hypocrisy violates a considerably more central tenet of Christianity.

III. 3. iii. Role Conflict

In any solitary institutional context, an actor has a definite status and is expected to enact the role associated with it. Upon entering another institutional context, the same actor has a different status and, to act appropriately, must enact its respective role. Moving among a variety of institution-specific statuses and enacting each of the respective roles ordinarily causes no difficulties because each institutional domain, virtually a compartmentalized unit, is segregated from each of the others. Even when the segregating boundaries are broken, a dilemma over proper conduct will not arise if the respective roles do not contain incompatible normative dictates. Difficulties can arise, though, when institutional insulations are ruptured, the actor is in the position of having to function in two statuses simultaneously, and the norms of the two respective roles specify mutually exclusive conduct. Problems confronting the actor because fulfilling the requirements from one institutional sphere would make it impossible to meet the responsibilities in another are problems of role conflict (Goffman, 1961, p. 91).

______________________________
Insert Figure 10 about here
Casting the problem of role conflict formally, suppose that in institution \( I_c \) the actor has status \( S_j \). Having status \( S_j \) he or she, in order to perform appropriately, must adhere to its associated role, \( R_j \). One of the norms of role \( R_j \) is norm \( N_x \). In short, proper conduct for this actor when actively functioning in institution \( I_c \) demands adherence to behavioral specification \( N_x \). In addition, suppose that in institution \( I_d \) the actor has status \( S_k \). Having status \( S_k \) he or she, in order to perform appropriately, must adhere to its associated role, \( R_k \). One of the norms of role \( R_k \) is norm \( N_y \). In short, proper conduct for this actor when actively functioning in institution \( I_d \) demands adherence to behavioral specification \( N_y \). If behavioral specifications \( N_x \) and \( N_y \) are contrary, then the actor will face a dilemma should participation in both institutional domains be demanded at the same time. Adhering to \( N_x \) will render his or her conduct less than satisfactory in the realm of \( I_d \), but adhering to \( N_y \) will render conduct less than satisfactory in the realm of \( I_c \).

Symbolically, to denote the institution to which a status, this status's role, or the norms of this role belong; left-hand subscripts are applied. Status \( S_j \) from institution \( I_c \) may be written as \( cS_j \); role \( R_j \), associated with status \( cS_j \), may be written as \( cR_j \); and norm \( N_x \), from the set constituting role \( cR_j \), may be written as \( cN_x \). Similarly, status \( S_k \) from institution \( I_d \) may be written as \( dS_k \); role \( R_k \), associated with status \( dS_k \), may be written as \( dR_k \); and norm \( N_y \), from the set constituting role
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$\text{d}^R_k$, may be written as $\text{d}N_y$. Role conflict, then, is a manifestation of $(\text{c}N_x \rightarrow \text{a}) \land (\text{d}N_y \rightarrow \text{Not a})$ or, alternatively, of $\text{a} \rightarrow (\text{c}N_x \land \text{Not d}N_y)$ and $\text{Not a} \rightarrow (\text{Not c}N_x \land \text{d}N_y)$.

Examples of role conflict built upon occupational duties and kinship requirements meeting at loggerheads are readily fabricated or empirically culled since both domains have the potential of swelling beyond their usual time and place boundaries with unexpected and/or extraordinarily large demands. Having to work late or over the weekend because of an unanticipatable crisis at the office can force the negation of family plans. An emergency at home can necessitate abandoning work. Such conflicts may be intense or minor, depending upon the weightiness of the conflicting norms.

Role conflicts involving concerns of occupational roles clashing with concerns of kinship roles can take other forms. The apocryphal boss's son-in-law, who ascends despite obvious shortcomings, exposes one of the vexations possible when two immiscible statuses are mixed. Many corporations prohibit relatives from working in the same department because of the inevitability of role conflicts that would jeopardize organizational efficiency and welfare when working duties indicated action that would be personally disadvantageous for the relative (hence, also for the family and the actor himself or herself with respect to the kinship sphere).
III. 4. Separating the Person from the Role: Role Distance

If every actor performing role R were to adhere to every specificational norm in the ideal typification, including all the piddling minutia too inconsequential even to enter into the conveyance of convincingness; there would be no diversity among the performances of different actors. Although role specifications do, in point of fact, standardize conduct to a good extent (e.g. one teacher manages his or her class much like every other teacher; one police officer appears to be interchangeable with any other; likewise for dentists, secretaries, judges, shoppers, and so on); one actor's role performance is not an exact replica of another's. People bring their personality to their role, individualizing performances.

Personal distinctiveness is achieved through deviance from one or more of the norms of least importance. For instance, the instructor, wanting to seem extra friendly or less inclined toward academic pedantry, encourages students to call him or her by the first name. Another instructor, wanting to seem especially interested in the students, makes an effort to learn each of their names very quickly. Departure from the least important norms, be the norms specificational in nature (e.g. a tacit specification associated with the role of the instructor is to expect address using the surname) or statistical in nature (e.g. typically, in the sense of statistical modality, instructors need w weeks to learn the names of half the class), is referred to as role distance (Goffman, 1961, pp. 95-152). The term con-
notes the actor's placement of a symbolic distance between himself or herself as a person (i.e. the image he or she holds of himself or herself as a person and/or the image he or she wishes others to perceive) and the ideal-typical role performer (i.e. the image generally associated with people who perform the role he or she is performing). Consider the college student who wears a college T-shirt when working at his part-time job as a janitor. The shirt is a means of unobtrusively dissociating himself as a person from the role he is undeniably performing.5

Insert Figure 11 about here

Formally, role distance is identical to role impropriety and role unconvincingness. Relative to role R, action a is a manifestation of role distance if \[ a \rightarrow \text{Not}[N, k] \] where the value of k is high enough to bring the ad hoc norm into the region of consequentiality beyond that which bears upon the actor's fundamental credibility.

Role distance is commonly used by actors for dissociating themselves from embarrassing role fragments such as when they "trip, forget names, wear slightly inappropriate clothes, attempt to buy a too-small amount of some commodity, fail to score well in a game, arrive a few minutes late for an appointment, become a trifle overheated in an argument, \( \cap \text{or} \cup \) fail to finish a task quite on time" (Goffman, 1961, p. 104). Appendix C defines five gambits commonly used for distancing oneself from
untoward episodes. An employee, humiliated by a public castigation, may answer the boss in a supercilious tone or with other signs of contempt to show witnesses that he or she does not identify with the fragment of someone deserving of such blame. A young supervisor, abashed by having to reprimand an older subordinate, may soften it with a smile, a self-mocking tone of voice, an affected accent, and/or a delivery which is informal and fleeting.

The difficulty in programming the machine to exhibit role distance is that correct exhibitions require more than the haphazard choice of a norm (or small set of norms) to disregard for any arbitrary duration. The norm must be chosen that, when thrown over, will result in the desired effect (e.g. conveying warmth versus conveying a personal repugnance with the role). The replacing conduct must, itself, be fashioned correctly. This means that it depends upon additional substantive information (e.g. What are the things to do in a particular role to exhibit a light touch?). What is more, the replacing conduct must be incorporated into a role performance at the correct time, for the correct duration, and to a correct degree. If it happens to be a relatively permanent part of the actor's conduct, then it must be incorporated in a consistent manner.
IV. Conclusion

D. Raj Reddy ("Quo Vadimus: Computer Science in a Decade," 1981, pp. 354-355) believes that the transcending concern of computer science as a discipline is how to give the machine the knowledge that will enable it to be useful as a general enhancer of our God-given mental abilities (in the same vein that the engineering disciplines provide tools for enhancing our physical capabilities). Reddy states that algorithmic knowledge, such as the procedure for calculating the inverse of a matrix, is straightforwardly computerizable since no special ingenuity is needed to see how it may be adopted. More difficult to mechanize is knowledge of the sort written in textbooks and residing in the minds of professionals, the sort of knowledge being embodied within expert systems (e.g. Dipmeter Advisor and also CADUCEUS, formerly called INTERNIST). Even harder, says Reddy, is the packaging of "'informal' knowledge" (p. 355), information not learned from textbooks nor explicitly taught (nor, perhaps, even within conscious awareness) but abstracted from personal observation, practice, and that elusive amalgam termed everyday common sense. The representation of one type of informal knowledge, knowledge about the face-to-face interaction of human beings, was the focus of concentration here.

Presented here was a heuristic model of the formal structure of interpersonal conduct. Using this model, it may be possible to begin to design the data structures and the algorithms for enabling the machine to produce roughly the same results in so-
cial participation as human actors.

The programming language SETL, offering sets and tuples as well as the means for manipulating these conveniently at the problem level, could expedite the implementation of algorithms dealing with the sociological constructs formalized here. Roger Schank's approach to the representation of institutional patterns and personal motivations may prove of great value for providing the informational background required for such algorithms to operate. Beyond alluding to these, no attempt was made to consider the many practical problems associated with building such programs.

* * *
References


Zurcher, Jr., L.A., Sonenschein, D.W., & Metzner, E.L.


*   *   *
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Footnotes

1 In sociological theory, the interacting person referred to here is termed a social actor. This is because it is not necessary to be a human being in order to be a full-fledged interactant. Governments, governmental agencies, universities, university departments, individual classes, families, etcetera may function as social actors. For example, General Motors may negotiate with the Union of Automotive Workers. The requirements for qualifying as an actor are: (1) the capacity for making rational decisions, (2) the capacity for communicating with other social actors, (3) the capacity for pursuing goals, and (4) the capacity for adhering to prescribed standards of conduct.

2 A set is a collection of entities, each of which is different from each of the others. Sets are symbolized within braces (i.e. \{ \}) and may be defined either through an element-by-element enumeration (e.g. \{Mercury, Mars, Venus, Earth\} ) or through some kind of generic description (e.g. \{X \mid X is one of the four planets of the Solar System closest to the sun\} -- this is read, "the set of all X such that 'X is one of the four planets of the Solar System closest to the Sun' ") . A noteworthy property of sets is that the order in which entities are enumera-
ated is of no significance.

A pair is a type of tuple (i.e. a two-tuple). Alternate ways of describing a pair are as a tuple of length two and as a tuple having a pair of (i.e. two) components, a first component and a second component.

A tuple, also called a vector, is a collection of entities in which the entities must appear in a specific sequential order because interpretative meaning is ascribed to entities on the basis of where they are located. A familiar tuple, which happens to be a two-tuple (i.e. a pair), is the sequence of integers used to shorthand dates. The meaning of "3/5" is clear because the first component is understood to signify a month and the second component is understood to signify a day. In this paper, as in SETL, tuples are denoted within square brackets (i.e. \[ \] ).

\(^3\)Sets whose elements are pairs are known in SETL as maps. The map, like the set and the tuple, is a central data structure with properties and operations of its own (Dewar et al., 1981, chap. 2 -- pp. 9-11 & 53-61).

\(^4\)The very first to consider role strain as well as other structurally rooted sources of deviance as a problem confounding the proper conduct of norm-governed machines is Isaac Asimov through his robot stories. The earliest story centered upon a
role strain inherent in the three seemingly consistent laws of robotics is "Runaround." "Runaround" came out in 1942 but has been anthologized more recently (Asimov, 1950, pp. 30-47, 1982, pp. 209-226).

Examples of some extreme (and amusing) role distancing ploys used by college students working at a job they found both well beneath their dignity and humiliating appear in Zurcher, Jr., Sonenschein, and Metzner (1966).
Each dash stands for a different substantive
prescription or proscription (i.e. norm)
Adherence to a specification portrayed above
another (or to a specification within a
higher grouping than another) is more im-
portant with respect to proper role per-
formance.

\textsuperscript{a}The upper-most norms designate essential duties, prohibitions,
knowledge, skills, and attributes. Deviations from these are not
tolerated.

Those toward the center designate ancillary qualities custom-
arily associated with the role. Deviations may provoke doubts
about the actor's competence, seriousness, or sincerity.

Those depicted at the lowest level designate prosaic behav-
ioral detail. These may be deliberately violated as a means of
expressing individuality (i.e. role distance).
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Figure 2
Heuristic Illustration Showing that
the More Complete a Set of Norms
the Better the Role Specification\textsuperscript{a}

\begin{align*}
\text{specification 1} & \begin{cases} 
\vdots \\
\text{for role } R_k 
\end{cases} \\
\text{specification 2} & \begin{cases} 
\vdots \\
\text{for role } R_k 
\end{cases}
\end{align*}

\textsuperscript{a}Assuming that the ratio of important to unimportant norms is at least as high in specification 2 as in specification 1, then specification 2 is a more thorough enumeration of the norms constituting role $R_k$ and therefore would provide for a higher quality performance.
Figure 3

Heuristic Illustration Showing that
The Fewer the Irrelevant Inclusions in a Set of Norms
The Better the Role Specification

\[\text{specification 1}\]
\[\text{for role } R_j\]
\[\{\text{not applicable, not applicable, not applicable, not applicable}\}\]

\[\text{specification 2}\]
\[\text{for role } R_j\]
\[\{\text{not applicable, not applicable, not applicable, not applicable}\}\]

\[\text{specification 2 contains all the same normative entries as specification 1 but without those which are not applicable, hence tantamount to misdirection. Specification 2, therefore, provides for a higher quality performance.}\]
Figure 4
Heuristic Depiction of the Concepts of Role Sector and Role Set

Role Set for Role $R_i$

Role Sector $R_{i,1}$
(for use with role others of status $S_1$)

Role Sector $R_{i,m}$
(for use with role others of status $S_m$)

Role Sector $R_{i,n}$
(for use with role others of status $S_n$)

---

Role $R_i$, as depicted, is technically a role set composed of three role sectors. Role sector $R_{i,1}$ is applicable with role others (i.e. actors) of status $S_1$. Role sector $R_{i,m}$ is applicable with role others occupying status $S_m$. Role sector $R_{i,n}$ is applicable with incumbents of status $S_n$. 
The actor's status in the on-going activity is \( S_p \). His or her appropriate role is, therefore, role \( R_p \). Interacting with role others of status \( S_q \), the appropriate role sector is \( R_{p,q} \). If instead of enacting \( R_{p,q} \), the actor enacts sector \( t \) of role \( R_p \) (or any sector of \( R_p \) other than sector \( q \) or any sector whatsoever of any role other than \( R_p \)), then the exhibited conduct is inappropriate.
Figure 6

Heuristic Depiction of Propriety

\{ \text{Role } R_{p,q} \}

\rightarrow \text{a normative specification of primary importance is not adhered to}

---

\text{The on-going activity demands role } R_{p,q}, \text{ which the actor is performing. The conduct, however, is improper because it violates one of the role's norms of transcending importance.}
Figure 7
Heuristic Depiction of Convincingness

\[ \text{Role } R_{j,m} \rightarrow \text{normative specifications} \]
\[ \quad \rightarrow \text{of secondary importance} \]
\[ \quad \rightarrow \text{not being adhered to} \]

\[ a \text{The on-going activity demands role } R_{j,m}, \text{ which the actor is performing. The} \]
\[ \text{conduct is not improper because none of the norms of primary importance is violated. However, it lacks} \]
\[ \text{convincingness because of nonadherence to a number of ancillary norms.} \]
Heuristic Depiction of Role Strain

\[ \text{Role } R_{k,m} \}

\[ \text{CLASH} \]

\[ \text{CLASH} \]

---

\( ^a \)One of the prescriptions or proscriptions in the specificational set is incompatible with another.
Figure 9
Heuristic Depiction of Role Dissensus

Role \( i_{R_k} \) \( \rightarrow \) CLASH \( \rightarrow \) Role \( j_{R_k} \)

\(^a\)One faction of role others contentiously advocates a certain behavioral dictate as proper while another contentiously advocates as proper its opposite.
Figure 10
Heuristic Depiction of Role Conflict

\[ \text{Role } cR_j \]
\[
\begin{align*}
\text{(associated with} \\
\text{status } S_j \text{ in} \\
\text{institution } I_c) \\
\text{CLASH} \\
\end{align*}
\]

\[ \text{Role } dR_k \]
\[
\begin{align*}
\text{(associated with} \\
\text{status } S_k \text{ in} \\
\text{institution } I_d) \\
\end{align*}
\]

\[ ^a \text{One norm (or subset of norms) from the actor’s role in one} \\
\text{institutional context specifies action that violates a norm (or} \\
\text{subset of norms) from his or her role in another institutional} \\
\text{context.} \]
Figure 11
Heuristic Depiction of Role Distance

\[
\begin{align*}
\text{Role } R & \quad \rightarrow \quad \text{is replaced with an alternate action}
\end{align*}
\]

\[\text{aA norm from those of least importance, judiciously selected, is replaced with another stylization of performance over a suitable interval of time.}\]
Appendix A

Although norms in the formal sense are simple primitives, when it comes to the actual production of programs capable of social participation, identifying the norms comprising a specific role may turn out to be a central problem. The reason is that the welter of operative prescriptions and proscriptions for each role is difficult to enumerate. In fact, some norms, lying beyond the level of conscious awareness (unless violated), defy voluntary externalization. For instance, think of the young person about to embark on his or her first date (or about to pay a first condolence call). An inveterate is asked, "How do I act?" "What do I say?" Actually, the request is for an enumeration of the critical norms requiring adherence. Ordinarily an answer consists of an exasperated, "Just act natural," or "Just be yourself." Better than this will have to be done for the machine.

Developing explicit and reasonably comprehensive sets of norms, although a formidable task, should not prove insurmountable. Firstly, since the computer only interacts via displayed text, the complicated norms governing gaze control and physical positioning (i.e. kinesics) can be ignored as can those applying to speech rate, loudness, and tone of voice. Secondly, programs do not have to exhibit exemplary conduct the first time tried. As violations of social dictates are observed, the set of operative norms can be augmented. For example, one of those prescriptions everyone knows but few would think to externalize is
that when telephoning, it is customarily the caller's preroga-
tive (and duty) to act to terminate the conversation, not the
call's recipient. For the latter to end a call, an apology with
an explanation must be proffered. Should the computer in the
role of telephoner demonstrate misconduct because this norm had
been omitted, the exact nature of the misconduct could be pin-
pointed and the norm installed. Thirdly, sociology and cultural
anthropology can be drawn upon for help. In addition to having
literatures describing an immense range of contemporary roles,
they offer practical research-oriented and theoretical guides.

The research-oriented guides include suggestions for getting
a fix on those important but not readily thought-of norms. One
suggestion is to conduct informal surveys, asking people about
the sorts of things that irritate them with the conduct of those
in a specific role. Almost invariably, it is a violation of a
norm that causes annoyance. Asking what annoys you with people
on the telephone yields insight into the norms comprising the
role of the telephoner. Asking retail salespeople what annoys
them with shoppers yields insight into the role of the shopper.
Another suggestion is to note all the corrective comments that
have to be made to a novice role performer, such as a child dur-
ing his first visit to a library. Each corrective comment is a
manifestation of a normative prescription or proscription.

Theoretical guides consist of typologies designating concep-
tual realms within which important norms usually apply. One
such typology is the set of "pattern variables," so called be-
cause with respect to the patterning of conduct they are the sa-
lient abstract variables (Parsons & Shils, 1951, p. 77). This
typology consists of five orthogonal dimensions:

*** affective conduct versus affectively neutral conduct

which pertains to the amount of emotion or
the intensity of feeling (i.e. affect) that
may be incorporated by a role performance

Example: The role of spouse provides for affective display;
the role of filling station attendant does not.

*** diffuseness versus specificity

which pertains to the extensiveness of con-
cern a role performer may take in the life
and activities of another

Example: The psychotherapist may inquire into every realm
of the patient's present and past; the computer
science instructor is obligated to restrict his
or her concern to the student's performance in
the class at hand.

*** universalism versus particularism

which pertains to whether the role performer
must dispense treatment in a standardized
fashion or may (possibly even must) dispense
costomized treatment

Example: An Internal Revenue Service investigator is obliged to treat every tax examinee according to the same rules, regardless of political prominence or wealth; a waitress may extend especially cordial and prompt service to generously tipping regulars.

*** quality versus performance

which pertains to whether the role performer ought or ought not treat others on the basis of personal qualities over which they have no direct control (e.g. age, race, sex, sex-appeal, nationality, intelligence, state of health, etcetera)

Example: A bar's "bouncer" is supposed to prevent underaged individuals from entering; a police officer is supposed to enforce the law consistently, irrespective of age.

*** self-orientation versus collective orientation

which pertains to whether the role performer is entitled to attend to his or her personal interests, wishes, and impulses or whether he or she is bound firstmost to
other obligations

Example: A shopper may come and go as he or she wishes; a sales clerk is obligated to remain on his or her feet, poised to be helpful.

A different typology consists of the four "functional problems" that must be attended to by any integral collectivity (e.g. a large corporation, a university, a university's computer science department, a business partnership, a family, a bowling club, etcetera) in order to maintain cohesion and effectiveness (Parsons Bales & Shils, 1953). Some of the norms comprising a role may be inferred by examining what the status occupant must do, may do, and may not do with respect to each:

**** goal attainment

which pertains to the problem of focusing effort on the collectivity's transcending goal (i.e. its reason for being)

Example: The goal of a hospital is taking care of the ill. What precisely do physicians, nurses, orderlies, and so on do in this capacity?

**** adaptation

which pertains to dealing with the physical and social supports required for pursuing
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the transcending goal and the collectivity's material existence

Example: Hospitals have data processing departments not because these contribute to making people well but because of the needs to bill, maintain a payroll, keep track of supplies, and so on.

**** integration

which pertains to cultivating, preserving, and restoring harmonious relations among the collectivity's constituents (in the case of a family or group, these are people; in the case of a complex organization, these may be departments)

Example: The head of a department takes action to preserve group morale and interpersonal cohesion.

**** pattern maintenance

which pertains to maintaining patterns of performance (hence, the collectivity's reliability) by dealing with instances of deviance (i.e. violations of the norms) and pressures likely to promote an inclination toward deviance

Example: A visitor in the hospital is smoking in a "No
Smoking" area. What is the normatively prescribed action for a physician, a nurse, an orderly, another visitor, or a patient who encounters him or her?

Another complication glossed over in dispensing with norms as primitives is the problem of how to represent them in such a way that (1) general behavioral specifications can be converted into particular actualizations of conduct and (2) observed instantiations of conduct can be converted, for processing, into their normative understructures. This complication, obviously, is no minor subtlety. It poses the same enormous difficulties as those associated with understanding natural language. Schank's Conceptual Dependency Theory, however, is a demonstratively tractable approach to tying together deep structures and arbitrary verbalizations and/or action (Schank & Abelson, 1977, pp. 11-35). It or an enhanced derivation might provide the solution to the problem of the manipulatable internal representation of norms.
Appendix B

One transcript from ELIZA conveys such an uncanny degree of convincingness that Weizenbaum quotes it three times (1966, pp. 36-37; 1967, p. 475; 1976, pp. 3-4).

The convincingness resides in the computer's last statement, which literally stuns the reader as an inferential feat indicative of genuine insight. It seems that ELIZA had to combine the first three of the client's highly colloquial inputs into a single, coherent impression (i.e. that the client was coerced into seeking psychotherapy by her boyfriend) and then, a variety of issues and eleven inputs later, use this as the basis for a seemingly astute deduction:

- that the client's boyfriend coerced her into therapy may be leading her to think of him as a bully, although this thought may be, as yet, unconscious

- her boyfriend is a man to whom she is emotionally attached

- her father, similarly, is a man to whom she is emotionally bonded

hence: perhaps she is transferring a feeling about her boyfriend that she does not wish to acknowledge to her father
This kind of reasoning is popularly accepted as typical of psychoanalysis and as providing the rationale behind lines of probing, indirect questions.
Appendix C

Erving Goffman (1961, pp. 104-105 and p. 110) identifies five general strategems used for distancing oneself from embarrassing role fragments:

** explanation -- to attempt to persuade the role other that he or she (i.e. the actor himself or herself) is a hapless victim of circumstances or superficial appearances

** apology -- to convey that he himself or she herself is offended by his or her own conduct (i.e. the ad hoc role fragment)

** indignation -- to convey that he or she is offended by his or her own conduct but that another party, perhaps a present role other, is directly responsible for the plight

** a jocular style -- to show that he himself or she herself is unable to attribute serious significance to his or her own present performance so therefore, by extension, others must not construe it indicative of the actor as a person either

** ostentatious obliviousness -- to suggest that his or her performance is so blatantly alien to his or her personality that it defies acknowledgment

Two or more of these may be invoked at once. An excuse, for instance, is an explanation coupled to an apology.
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