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Technological "Shortcuts" to Social Change

Can major segments of contemporary social problems be
handled efficiently by technology?

Amitai Etzioni and Richard Remp

The idea that technological developments might be used to reduce the costs and pains entailed in dealing with social problems is appealing. A broad rationale for this approach is suggested by an analogy between the development of modern techniques of producing consumer goods and the search for new techniques of providing social services. Mass production and considerable reductions in cost per unit of consumer goods were achieved by an increased reliance on machines (broadly conceived to include communications satellites and computers) and a decreased reliance on muscle and brainpower, on persons. However, up to now in social services, in which performance is frequently criticized for falling far below desirable levels, most work has been unmechanized. Since the need for services in these areas is great, available resources low, and trained manpower in short

supply, it seems useful to consider replacing the "human touch," at least in part, by new technologies (1).

A Methodological Note

To explore this question, we reviewed existing studies that evaluate the effectiveness of technological shortcuts in dealing with six distinct social problems (2). The term "technology" is construed here to apply to biological and physiological processes, as well as physical processes. This is in accord with R. S. Merrill's use of the term (3): "the concept of technology centers on processes that are primarily biological and physical rather than psychological or social processes." "Hard," or physical, technologies are emphasized rather than "soft," or social-psychological, technologies because the shortcuts in question derive their efficiency not from the reorganization, but from the replacement of human services in the handling of social problems.

The technologies and problem areas

selected were methadone in controlling heroin addiction; instructional television (ITV) in teaching; Antabuse (disulfiram) in treating alcoholics; gun control in reducing crime; the breath analyzer in highway safety; and the intrauterine device (IUD) in birth control. These technological innovations may be viewed as shortcuts because they either serve as a replacement for manpower (for example, the use of ITV instead of teachers) or they reduce the need for manpower (for example, methadone reduces the need for therapists, social workers, and guards in the treatment of heroin addiction).

The findings reported here are, of course, affected by the developmental status of the technologies studied. If we had selected technologies that were already in routine use, our findings might have been more optimistic. However, few of the technologies routinely used in the human services area aim at the core of the problem (although there are various auxiliary instruments—for example, teaching aids). We focused on procedures that would fundamentally affect the service in question. As a consequence, technologies still in various experimental stages were studied. Technologies other than the six reported were surveyed, although less intensively (such as the use of computers for instruction and cable television for conducting town hall-like dialogues); they do not differ significantly from those selected, from the viewpoint of the issues at hand.

The Main Findings

To the degree that the data permit us to conclude, each of the six technologies "works," in that it allows the

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handling of a significant part of the social problem faced at a considerable reduction in cost and in pains of adjustment. These conclusions are tentative, since the technologies are still experimental and limitations are inherent in evaluation research.

Methadone

Methadone is a narcotic drug, a synthetic, addictive opiate, which is being administered experimentally to heroin addicts to prevent the use of heroin. In one program, conducted in New York City and currently involving several thousand heroin addicts, patients have been maintained on methadone for periods of up to 6 years (4). Follow-up studies indicate that most of the individuals being maintained on methadone on an out-patient basis have not become heroin addicts again. Their involvement with the police and courts is over, and they hold jobs or study. That is, they have become socially rehabilitated. Among a group of 990 men examined in a follow-up study, the percentage of those employed or in school rose from 29 percent at admission to the methadone program, to 65 percent after 1 year on the program, to 74 percent after 2 years, and reached 92 percent by the end of their third year on the program (5).

At this time, the therapeutic use of methadone has not been federally authorized, and all the reports are based on what are legally defined as research and experimentation programs. Accordingly, there is little evidence on the usefulness of methadone under routine conditions of mass use. On the other hand, the number of addicts under treatment in these programs has risen rapidly in the last 7 years [to 3485 by 31 October 1970 (6)], and the research element has played a smaller role in several recent programs; thus, the technique is, in practice, no longer strictly experimental.

Antabuse

In contrast to methadone, which is a blocking drug reported to prevent individuals from getting a high from the use of heroin, Antabuse is a counterdrug that produces an aversion to alcohol. It makes those who consume alcohol while on the drug feel nau-

seated and otherwise uncomfortable. It has not been subjected to the extensive research or given the same attention by the press that methadone has, and it is much less "accepted" by public authorities or members of the medical profession. One reason is that, during the early 1950's, relatively high dosages (1.5 grams) of Antabuse were used, and the resulting troublesome and occasionally dangerous side effects suggested to observers that the drug's utility might be quite limited. However, subsequent research indicated that lower dosages (0.25 gram) might be used effectively, avoiding or rendering manageable most of the side effects while permitting the necessary discomfort-producing alcohol-Antabuse reaction to occur (7). In one follow-up study, 71 patients out of an original testing group of 118 patients were contacted 2 years after the start of treatment. Fifty-one percent of those contacted reported no relapses (17 of these 36 individuals were still taking Antabuse), 32 percent reported one or more relapses (21 of these 23 individuals were taking Antabuse), and 17 percent reported failure (none of these individuals was taking Antabuse) (8). However, since many evaluation studies of Antabuse combine patients who are continuing to use the drug and patients who have stopped using it, it is unclear from "abstinence" figures the extent to which abstinence is maintained once administration of the drug has stopped. In any event, greater experimental use of the drug seems advisable.

Instructional Television

There are several hundred studies of the effectiveness of television for instructional purposes. There are even several summary reports of the ITV studies. The reviews report that "the vast majority of these studies has revealed 'no significant differences' in measured performance between students who were taught via television and those who were taught directly" (9). For example, in 1956 ten lessons in physics and ten lessons in algebra were broadcast to 2405 students in 34 Chicago high schools (10). At the end of the lessons, examinations on the material were given both to students who had received televised instruction and to students who had received face-to-face instruction based upon

course outlines prepared by the television instructors; no significant differences were found between the scores of the two groups. Although no direct inference can be drawn from the statistical finding of "no significant differences," the large number of studies in which this occurred implies great success, because it suggests that the carefully rehearsed, repeatedly usable, and economical videotaped instruction might be used where teachers are not available, or to release teachers for other tasks. A single lesson can be presented to many more students across space through closed circuit or broadcast television, and across time through videotape or film than through face-to-face instruction. This multiplicative capacity of ITV also implies that the average quality of contemporary instruction might be raised if the technology were used selectively, to extend the influence of the more competent instructors.

Unlike Antabuse, in whose case effectiveness is less well-established and where the extent to which it is established is not widely known the effectiveness of ITV is fairly widely known—yet ITV is not widely used. A report prepared for the President and Congress in 1969 estimated that the use of televised instruction in the nation, as well as films, filmstrips, records, programmed texts, and computer programs, does not fill more than 5 percent of instructional time (11). It appears that ITV has a considerable capacity, not presently being exercised, for increasing the quantity and quality of instruction.

Breath Analyzer

The breath analyzer (12) is a relatively simple device for detecting in a preliminary fashion whether or not a person is intoxicated. The subject blows into a tube or balloon, and a chemical reactant in the device changes color, thereby giving a rough indication of the proportion of alcohol in the subject's breath.

Since a high proportion of automobile drivers in fatal crashes (44 to 60 percent) have been found to have enough alcohol in their blood to significantly impair their driving ability [concentrations of more than 0.10 percent alcohol in the blood (13)], it seems that if a significant portion of motorists could be prevented from

driving while intoxicated the rate of fatal auto accidents might be reduced considerably. In Great Britain, when in 1967 a law was passed making it illegal to drive a car while intoxicated (having a concentration of 0.08 percent or more alcohol in the blood) and an enforcement program utilizing the breath analyzer was highly publicized, fatalities in auto accidents during the following year decreased by 15 percent, serious injuries decreased by 11 percent, and total auto accidents decreased by 10 percent (14). Although during the second year of the program the reductions in deaths (10 percent compared to the year prior to the program), injuries (9 percent), and accidents (10 percent) were somewhat smaller than they were during the first year, the figures continued to suggest that the approach did reduce auto fatalities and accidents, particularly during the hazardous nighttime drinking hours. There are fewer data on this technology than on the others, in part because a simple, portable, screening procedure, which is central to a workable auto safety program, was only recently developed.

Intrauterine Device

The intrauterine device is an object, made of various materials (often plastic or nylon) in various shapes (such as rings, spirals, or loops), which is inserted in the uterus for the purpose of preventing conception. Although effectiveness varies with the size and type of device and with the age and pregnancy history of the woman, "pregnancy rates for [women using] the IUD are quite low, typically with the best devices about 2 to 3 per 100 cases in the first year" (15). The IUD seems to be more effective in controlling birth rates than are most other birth control measures, such as diaphragms or pills, since the latter require more continuous motivation on the part of the user and are apt to be more expensive.

The IUD, however, involves a number of difficulties: it is sometimes involuntarily expelled, and instances of medical complications are reported (for example, perforation of the uterus, excessive bleeding, the promotion of infection, and, possibly, cancer). One major follow-up study reported rates of 14.9 involuntary ex-

pulsions per 100 first insertions, and 22.0 removals per 100 first insertions for medical reasons 2 years after insertion (16).

National family planning programs, relying heavily upon IUD's, have been instituted in a number of developing countries during the past decade, with Taiwan and South Korea having particularly high per capita rates of IUD insertion. In 1966, 17 percent of the women from 20 to 44 years of age in South Korea were using IUD's, as were 13 percent of the women from age 20 to age 44 in Taiwan (15, p. 2). There is disagreement on the implications of the characteristics and the IUD retention rates of participants in the programs for the long-term utility of the IUD (17). In addition, it is difficult to estimate the exact impact that large-scale IUD programs have upon national birth rates because of the difficulty of gauging the effectiveness of alternative birth control measures that might have been used by participants in the program. However, assuming that IUD acceptors (i) were as fertile as, or more fertile than, other married women in their age group and (ii) that they would not have used other contraceptive methods more effectively than the average woman in each age group, it has been estimated that, if the 547,000 IUD's being used in South Korea at the beginning of 1967 remained in situ for 1 year, there would be between 110,000 and 160,000 fewer births per year, or a drop in the yearly birth rate of 3.7 to 5.3 [South Korea had a crude birth rate of 44.7 in 1959 (18)]. Similar calculations indicate that Taiwan's program would lead to a drop of 3.0 to 5.0 in the annual crude birth rate [Taiwan's crude birth rate in 1964 was 37.1 (18, p. 144)] and that Pakistan's much less extensive family planning program would lead to a reduction of 1.0 in the nation's crude birth rate [which was 43.0 to 46.0 in 1964 (18, p. 145)] (15, p. 12).

Gun Control

Since firearms are unusually efficient and deadly weapons [one study found firearms attacks to be five times more deadly than knife attacks (19)] and since most homicides appear to be impulsive acts [Federal Bureau of Investigation statistics indicate that

82 percent of all murders in 1962 were committed within the family unit or among acquaintances (20)], a significant reduction in the availability of domestic firearms should force many potential killers to use less efficient weapons or to express their aggression in other, less harmful ways. Gun control, in contrast to the other innovations discussed here, is a "negative" alteration in the technology of a social problem: the restriction or removal of a preexisting technology. Such procedures might be useful when a developing technology (or the changing context of an existing technology) leads to a widely recognized social problem and when that technology is susceptible to control or elimination through legislation.

It has been suggested that the gun control example is not comparable with the others because the action involved here is social legislation, not a technological intervention. This is clearly true. Our reasons for including the example are several. First, the net effect is achieved not by the change in the law, but by a change in the technology of violence available to citizens. If a law is passed and this technology is not changed (a rather common occurrence), gun control will not be affected. If the technology is changed in some other way without a change in law (if more powerful guns are bought or if there is a shortage of bullets), crime will be affected. Changes in the technology of violence are hence the salient and relevant variables. Perhaps "changing the level of armaments" is a better characterization of the variable, but "gun control" is the term commonly used. Second, as the discussion indicates, from every other viewpoint, the effects of this intervention and the problems it raises are very similar to those of the other interventions (for example, it assumes no change in the personalities of the criminals; it works better for some subgroups of the population afflicted with the problem and some goals than others; it is relatively inexpensive, compared to non-technological approaches). Third, as the study of pollution control and food additives suggests, there are many other areas in which the main effect would be brought about by removing rather than adding a physical element. Hence the special interest in this intervention.

The relationship between the re-

strictiveness of gun control laws, including domestic disarmament, and rates of homicide and armed robbery has been investigated by comparing the crime statistics of regions with varying degrees of gun control. Overall, these comparisons indicate that restrictive gun control measures, such as prohibiting the private ownership of handguns, are associated with significantly lower rates of homicide, armed robbery, accidental death, and injury due to firearms.

This observation is based mainly upon international comparisons, since gun control laws within the United States are very limited in formal restrictions and the effect of them is vitiated by the largely unrestricted movement of firearms between jurisdictions with differing degrees of formal restrictions. International comparisons suggest that the availability or absence of firearms, particularly handguns, significantly influences rates of homicide and armed robbery (21).

In summary, although in most instances the technological shortcuts reviewed are not widely utilized, they all seem capable of contributing to the reduction of the relevant social problems.

Limits of the Evaluation Data

A detailed evaluation of the utility of the technologies reviewed here is inhibited because much of the needed information is missing. Evaluative studies frequently report a technology's achievement of a broadly defined objective, but bypass questions of how the result was produced and what other effects occurred. The favorable evaluations of methadone programs, for example, rest primarily on observations that patients usually end their involvement with the police and begin to hold steady jobs or study. There are, however, several competing theories as to how methadone works. One researcher argues that the primary effect of methadone is physiological (for example, methadone fills a metabolic deficiency that was created by heroin use); others see its major consequences as psychological (for example, it tranquilizes the user and suppresses psychic problems); still others believe the methadone program changes the social context (heroin addicts are in touch with criminals, methadone users with doctors and social workers). Thus, al-

though the desirable results of the program are fairly evident, the processes involved are not clear.

The long-term consequences of the treatment are unclear also. Methadone is addictive and is used most often as a *maintenance* drug, which has to continue to be administered if it is to be effective. Programs in which low dosages of methadone are used or in which the drug is withdrawn are reported to be much less effective in curbing heroin use. It is not known what the long-term physical and psychological effects are on the person being maintained on methadone. Thus, when the methadone program is said to "work," the evaluation reflects chiefly the more visible and immediate effects, and not an understanding of how the program "works" or of what the long-term effects are.

Similarly, evaluation studies of ITV do not allow us to answer several key questions. For example, it is difficult to tell whether ITV is effective by itself or whether it requires human supplements, such as discussion groups; many studies have obscured this question by comparing "live" teachers to ITV *plus* various forms of supplementary live teaching. The remaining studies do not allow a sharp evaluative picture because of serious methodological limitations. A review of 250 comparisons of live and televised instruction contained in 31 reports showed that most of the comparisons were ill designed, used inadequate samples, misinterpreted the data, or suffered from other serious flaws (22). Nor do the studies indicate clearly which topics can be taught effectively over television and which cannot. Can one really communicate normative and esthetic values (a central objective of many courses in civics, history, art, and literature) as effectively as substantive information over the cold, impersonal, nonreactive medium?

The information about the other technologies is similarly fragmentary. The use of the breath analyzer in a British highway safety program is associated with a reduction of fatalities on the road, but it is not clear whether this was due primarily to the novelty of the program or to a lasting deterrent power of the program. Additionally, there are serious questions about the reliability of the breath analyzer as an indicator of alcohol levels in the blood (23). There are also some serious obscurities in the data on gun

control (24). Some regions within the United States (for example, the Midwestern states) that have relatively few limitations on guns also have significantly lower rates of dangerous crimes. While the influence of factors other than the availability of firearms upon crime rates has never been doubted, if the presence of guns is a very significant influence these observations are difficult to account for. Finally, the precise manner in which the IUD works is not known, nor has the claim that it might encourage cancer in some women been fully rejected. Thus, beyond the indications of the technologies' overt effectiveness, the limitations of the data are lack of knowledge of the process involved and of long-term effects, simple incomplete evaluation (for example, it has not been established whether methadone really blocks the effects of heroin), contamination of variables, and the lack of sufficient "controls" or comparative data.

The causes of limitations of the knowledge available are numerous. Some are external to the research process, others are intrinsic. Jointly, they make the information not just incomplete and tentative, but fragmented and frequently difficult to rely upon. Moreover, it seems that highly reliable evaluations may be very difficult to produce, and we may need to act without them.

Extrinsic Factors

The research process is influenced from other areas of social activity, through economic pressures, political considerations, moral inhibitions, and legal constraints. While basic research is to a considerable degree protected from these forces, much of the research relevant to the societal application of new technologies is vulnerable. Such research lacks the ideological defenses and, usually, the institutional protection available to basic research. The implications of applied research are usually apparent enough to arouse opposition among some of the people who would be affected by the adoption of the experimental procedure.

Political forces, most clearly illustrated by the gun lobbies (25), make it very difficult to obtain research funds for the consideration of, to say nothing of experimentation with, domestic disarmament—the type of gun

control likely to be most effective for reducing violent crime. Experimentation with the extensive use of ITV tends to affront some faculty members, who are concerned about being replaced by machines (26).

Morally, the use of drugs to treat addiction is criticized for permitting patients to avoid developing the strong "willpower" that many people—including spokesmen of the medical profession—believe a person should have. Legal problems arise when the breath analyzer is administered involuntarily, and the subject is, in effect, made to incriminate himself (27).

The limited amount of support for such research and the manner in which it is administered also contribute to our fragmentary understanding of social technologies. A belief in the generally equal competence of all potential investigators and in their ability to determine the most useful direction research can take prevails among those who manage research in this country. Of course equality in the distribution of resources among researchers and institutions is not even approximated, but pressure for such a distribution exists (28). Hence, research by many people who have no business doing research is supported. The resulting poor quality of research is illustrated well by many of the ITV studies: they eat up funds, clutter up the libraries and computer memories, confuse policy-makers, and retard the developments in question. An arrangement whereby all ITV studies (or studies on any other subject) would be carried out by perhaps three competent research centers would be, to put it mildly, in sharp contrast to the procedure traditionally followed in this country. It would offend the community of researchers as well as Congress.

Equally problematic is the prevalent belief that the researchers alone should decide what to study. Unlike work ordered by the National Aeronautics and Space Administration and the Department of Defense, much of which is contracted quite specifically, especially when technologies are involved, the government and foundations have tended to shy away, at least until recently, from contracting for specific technologies in social areas. Most federal agencies concerned with domestic affairs do not have the research budget or the intellectual manpower needed to develop a clear research program that would allow them

to approach a university or research corporation and order the studies needed to answer specific questions in their area of concern. Thus, instead of providing direct support to troubled areas, we frequently seed oceans of studies in the hope that bread will wash ashore where needed.

The limited knowledge of technologies also reflects the relatively small investment of resources and professional manpower in this area. From 1965 to 1970, the amount of money spent on research conducted in each of the areas examined can be safely estimated as below the million-dollar mark for the 5-year period, with the IUD being a possible exception (however, much of the expenditure on the IUD is not for research, but for demonstration projects). Since there is a correlation between investment in research and development and scientific output (29), this is a significant limitation on development in these areas. The relatively limited development of the behavioral sciences in general also limits potential understanding of technologies.

Intrinsic Factors

Even if there were more support and guidance of research concerned with technologies, intrinsic obstacles to understanding would still lie in the very process of producing knowledge. Scientific disciplines are primarily analytic in operation; they fragment the world into their respective sectors and then study these sectors as if the rest did not exist, or could be held constant. In doing applied research, one should be able to piece together different disciplines' findings into an interpretation of the actual system in which the interventions being studied take place. However, the integration of analytic observations from various fields is a difficult and hazardous task. What tends to happen is that the study of integrated, practical problems occurs in nonanalytic disciplines, such as engineering, medicine, social work, and education, which draw on their own traditions as well as on the analytic sciences. The process by which an applied discipline draws on the observations of analytic disciplines is very poorly understood, but it appears to be much less systematic and sustained than is often assumed. Research conducted in these applied disciplines

seems to be oriented by two ranked criteria: effectiveness in advancing practical ends, and, in a secondary, supportive role, the canons of methodological adequacy and analytic precision characteristic of the basic sciences. The considerable reliance on nonanalytic disciplines in the development and evaluation of technologies is a major reason we know more about the extent to which a technology "works" (that is, is apparently effective) than about how it achieves its effects. The "how" requires theorizing that tends to be analytic. Hence, the experimental applications are often described as "approximations," evaluated on the basis of their most obvious consequences as "usable" or not so, but are full of the kinds of gaps in understanding discussed earlier.

In short, the combination of extrinsic pressures and intrinsic hindrances seriously inhibits the development of sophisticated knowledge in these areas. This situation suggests that evaluations of the effectiveness of technologies will continue to be based on relatively crude information and that policy-makers will have to continue to draw on such information in their decisions, although, of course, some improvement is possible. Accordingly, one should not oversell technology assessment as promising, but instead recognize that technological shortcuts, like shortcuts across fields, are often crude, although useful, pathways.

Specification of the Effectiveness Proposition

In the six cases studied, and in others surveyed more informally, it appears that the shortcut works much better for one or more of the important subgroups of the population afflicted with the problem and for the remedial goals than it does for the others. Even when we cannot specify how the technology influences the people it does serve, we can often distinguish these people and effects from other subgroups of the population involved in the problem and from other remedial goals. Gun control appears more likely to save lives and avoid crimes in the cases of impulsive killers than it does in the case of determined criminals. Fortunately, impulsive men constitute the majority of convicted killers. The breath analyzer seems more effective in deterring the

social drinker than in deterring the habitual drinker, who is the core of the drunken-driver problem. Thus, even crude ideas of the technological shortcut's operation and effects can lead to major discriminations about what proportion of the population afflicted with the problem is likely to be affected.

Similarly, in terms of goals, methadone seems to "work" if our purpose is *social* rehabilitation. However, it seems to have little value as a source of psychological rehabilitation, other than removing the effects of the taboos on heroin. That is, if a person uses heroin to deal with psychic stresses—because he wishes to escape reality, or because he is overdependent on his mother—methadone does not seem likely to make him mature enough to be willing to face reality, or cut off his undue attachment to his mother.

Thus, even under conditions of crude information, which may well be endemic to this type of evaluation, asking "Works for whom (which subgroup of the population afflicted with a given problem) and for what purposes?" clarifies the probable effectiveness of the shortcuts. The six shortcuts examined here seem, with the possible exception of the breath analyzer, to reach a significant subgroup of the population afflicted with a given problem and several of the goals.

Technology as an Alternative

A common way of evaluating a remedial social procedure is to ask how far it goes toward achieving the final goal—does it eliminate addiction, or end crime? Ignoring the fact that all remedial social procedures fall markedly short of eliminating the problems altogether obscures significant differences among them. A more profitable form of evaluation is to inquire how effective the technique is, relative to other procedures (30). Accordingly, it seems useful to review the efficacy of some alternatives to the use of technologies in the reduction of social problems.

One of the main alternatives to the use of social technologies in social problems is the use of punitive procedures. Heroin addicts are incarcerated; penalties for traffic violations have increased; and it has been suggested that people who have "too many" children be penalized by removing tax deductions for dependents or charging them

a special tax. However, as criminologists M. Wolfgang and F. Ferracuti have observed, "punishment per se is certainly a confirmed failure as a treatment technique" (31). The limited deterrence provided by imprisonment has been well documented. Studies have shown that one-half to two-thirds of those confined in prisons, reformatories, and jails in the United States have served previous sentences in the same or other institutions (32). Penalties are certainly partly effective, probably particularly so with regard to first offenders. Still, the limited capacity of punitive procedures, operating alone, to deter motivated behavior and the difficulty of sustaining a high level of public support for such approaches have been repeatedly demonstrated. Prohibition is the best known case in point. Recently, laws prohibiting marijuana have been compared to those prohibiting alcohol; they are being eroded. While a minor reduction in the population afflicted with a problem might be achieved through the imposition of increased penalties, the procedure's direct operational expenses and the indirect costs, such as increased alienation and the growth of patterns of evasion, are likely to be high.

The information approach—educating people on the undesirability of smoking, drinking to excess, using narcotics, or being overweight—seems effective mainly when coupled with other techniques. By itself, the providing of information, particularly through the mass media, tends to be ineffective, since the reasons that people engage in these forms of conduct are often deep-seated and not apt to be altered by an encounter with new information. Contrary to a once widely held belief, studies show the mass media to be an effective means of persuasion only in matters in which there is little or no resistance to the adoption of new views (33). It is possible to use advertising to get people to switch from one brand of liquor to another, but not to get them to stop drinking.

The therapeutic approach—procedures such as psychotherapy, psychoanalysis, and rehabilitation counseling—has been generally regarded as ineffective, particularly with regard to specific pathologies such as alcoholism, heroin addiction, or criminal behavior. Even in the case of more diffusely defined psychological disorders, follow-up studies have shown psycho-

therapeutic treatments to be no more effective than custodial care in state hospitals, medical care that is not deliberately psychotherapeutic, or, in some studies, the absence of formal treatment altogether (34). Jerome Frank has observed (35, pp. 13–14) that

... statistical studies of psychotherapy consistently report that about two-thirds of neurotic patients and 40 percent of schizophrenic patients are improved immediately after treatment, regardless of the type of psychotherapy they have received, and the same improvement rate has been found for patients who have not received any treatment that was deliberately psychotherapeutic.

Somewhat more positively, Frank notes that "by and large . . . the effect of successful psychotherapy seems to be to accelerate or facilitate healing processes that would have gone on more slowly in its absence" (35, p. 225). In addition, the availability of psychotherapeutic treatment for problems such as heroin or alcohol addiction is limited. Psychotherapists, psychoanalysts, and social workers often refuse to treat alcoholics, in part as a consequence of small hopes for success. A number of psychotherapeutically oriented programs have attempted to treat heroin addicts (36). However, when addicts continue to live in their original communities and receive psychotherapy only during visits to program centers, the results are often discouraging. In one such program, which was examined in a comparative study, the attrition rate was high [47 to 57 percent of the patients were seen three times or less (36, p. 18)], and only a small percentage of the patients completed associated vocational training or held steady jobs (36, p. 20).

Thus, for problems such as heroin or alcohol addiction, psychotherapy's discernible impact is quite minor. A major reason seems to be the individual's exposure to only a few hours of psychotherapy a week. When a person is integrated into a "total" therapeutic community, a community in which he lives or is otherwise deeply involved (for example, Synanon for heroin addicts or Alcoholics Anonymous for alcoholics), this form of therapy is much more effective. However, these groups have served only very small fractions of the populations afflicted, and it seems that there is little which can be done to significantly increase their number. These therapeutic groups appear to grow in a gradual, unplanned

fashion, and do not seem susceptible to large-scale, controlled promotion. Overall, increased utilization of the therapeutic approach in the problem areas being considered is likely to require considerable investment in trained manpower and to offer only slight reductions in numbers of people involved.

The review of the main alternative means of handling social problems suggests that technological interventions are more effective, in that they can aid a larger proportion of the population afflicted, and are more economical on a per capita basis. A study of the cost effectiveness of various means of preventing deaths in auto accidents, for example, indicated that promoting the use of seat belts may save a life at an individual cost of \$87, while driver education procedures may cost as much as \$88,000 per life saved (37). Similarly, even if detaining the heroin addict in a rehabilitation center and maintaining him on methadone in the community both led to the same rate of social rehabilitation (steady employment and no involvement with the police), the costs of rehabilitative detention, both direct and indirect, would be much higher than those of methadone maintenance. Methadone costs only a few cents a day, and, although administration procedures increase expenses somewhat (administration by pharmacists has been tried), the procedure is still far less costly than a custodial program, particularly one involving psychotherapy [which costs \$10 to \$70 a day per patient (38)].

Technological intervention is not only financially cheaper, its psychic costs are smaller. In many instances the technological intervention seems to reduce significantly the level of motivation required for progress, either by increasing the difficulty of undesired conduct (for example, under domestic disarmament it is very difficult to get a gun, especially on the spur of the moment), or by lowering the degree of self-control required for a desired behavior (for example, the availability of methadone makes forgoing heroin easier, and the IUD allows individuals who are fearful of birth control in general, or who are unable to use contraceptive devices either routinely or in a moment of impulse, to make a single, long-term decision).

Thus, while technological shortcuts are not absolutely effective—they do not deal with the full range of prob-

lems—they do seem more likely to increase effectiveness in handling major parts of these problems at lower economic and psychic costs than do punitive, therapeutic ("total" therapy being effective, but of limited applicability), or informational efforts. Although an advertising campaign about the dangers of drug addiction, increased legal penalties for heroin possession, and a considerable increase in psychotherapeutic treatment for addicts might each diminish addiction by a few percentage points, it seems possible that the proportion of heroin addicts susceptible to treatment with methadone may be as great as one-third of the total group.

Combining Approaches

Will the effectiveness of a technology be increased if it is combined with one or more of the other approaches? Unfortunately, the available studies offer little guidance in this area. The relative merits of such combinations are obscured because many of the studies that might provide all or part of such comparisons are, for this purpose, contaminated; they include various mixes of remedial approaches with little attention paid to analytically specifying these effects. For instance, reviews of ITV studies which report that ITV is as effective as live instruction include studies with varying kinds and degrees of live adjuncts to the televised instruction. Antabuse and methadone reports also fuse varying degrees of group formation and counseling in their results.

The most we can tell is (i) the technologies "work," or achieve some goals for some significant subpopulation, *without* additional inputs; (ii) to the extent that "human" supplements are required, they tend to remove the main value of the technologies—their economy. If each ITV classroom requires an instructor to supervise discussion, and the instructor has to be well trained, the per capita costs of a televised lecture course may be higher than a live lecture course. If, besides employing a technology, psychotherapy is needed before individuals can learn to forgo heroin, excessive drinking, homicidal and suicidal driving, or be persuaded to change their family size preference, the costs of a remedial program will quickly rise by a factor of 100 or more.

On the other hand, some subgoals

will not be achieved by the technological approaches. Methadone provides social, but not psychic, rehabilitation. It may open the door for personal growth without professional help, or leave personal problems untreated. Domestic disarmament will render many aggressive acts less harmful, and might reduce aggressive behavior somewhat, but it will not affect the main sources of aggression. Even if the nontechnological approaches are less cost-effective, they will, given sufficient resources, contribute to the solution. By and large, though, the case for mixing approaches is much less powerful than is often assumed, and the case much stronger for seeking and using technologies exclusively.

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NEWS AND COMMENT

City College of New York: Bearing The Brunt of Open Admissions

At the Hanukkah Festival sponsored by City College's Hillel Foundation last week, Dr. Robert E. Marshak, the president, beat 30 professors in the faculty dreidel-spinning contest. The dreidel is a small multisided spinner which has come to be associated with the Hanukkah observance. This was the second year the world-famous physicist won the campus championship. Afterwards he showed the faculty and students how he had prepared for the contest by working out in advance the physical properties of the dreidel.

He used a complicated series of mathematical formulas.—Item from Leonard Lyons' syndicated column, 23 December 1971.

This curious little story contains a number of ironies, most of them stemming from open admissions at the City University of New York (CUNY) and its effects on City College (CCNY), the oldest and best known of the nine senior colleges in the CUNY system. Perhaps the college's public relations office promoted the item in the hope of preserving something of a Jewish image for CCNY—a task that would hardly have seemed necessary a few years ago, when the college was graduating, as it had since the turn of the century, classes with a Jewish population exceeding 80 percent. The ethnic innuendo, however, implies many things besides current population levels. As the children of Eastern European immigrants flooded CCNY throughout the first part of this century, they brought with them a tradition of learning that, either because of

or, as many believe, in spite of the institution itself, transformed CCNY into a highly respected educational facility.

A recent survey indicated CCNY to be second only to the University of California at Berkeley in the number of undergraduates who went on to earn doctorates. And to a nervous mother in Brooklyn or the Bronx, tales of dreidel spinning might indicate that her child could still go on to graduate study from CCNY, in spite of stories she's heard of drugs and crime at the campus on St. Nicholas Heights at the edge of Harlem, of a lowering of academic standards, and of the myriad problems that have confronted CCNY since the beginning of CUNY's open admissions policy.

Since September 1970, when the New York Board of Higher Education opened the doors of CUNY's senior col-

leges to everyone graduating from a New York City high school in the top half of his class or with an average of 80 or above, much has been written and spoken about open admissions. Most observers see the policy as beset with problems, but nonetheless a tentative success. However, CCNY has experienced some unique difficulties since open admissions began—most of them stemming from the decline in the number of high-achieving high school graduates who select City as the college of their first choice. The decline has occurred for a complex series of reasons—primarily the college's location and its changing reputation—but it has left CCNY this year with the highest percentage (55 percent in this year's freshman class) of students admitted with below 80 averages of any of the CUNY senior colleges. This change in the past 2 years has generated a number of problems for CCNY, not least of which is that the faculty of a distinguished college, accustomed to teaching the cream of high school graduates, suddenly finds itself confronted with students who, as the product of ghetto schools, often read or write at the eighth-grade level and who, in some cases, cannot conceptualize how a seesaw works.

These difficulties are compounded by a severe financial squeeze that has left all of CUNY with much less money for open admissions than had originally been promised. Because of the shortage of money, the Board of Higher Education recently decreed a "10 percent increase in productivity" for all faculty members—an order that CUNY faculty members find particularly irk-