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SUICIDE INTENTION AND SUICIDE PREVENTION: A MODEL OF THERAPIST-PATIENT INTERACTION

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Gideon Yaniv

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ABSTRACT

Suicide has long been recognized as a major public health problem. While public health policy can do little to affect the circumstances that lead individuals to wish their own death, it may well prevent suicide either through modern crisis therapy which, if successful, eliminates the drive to die, or through protective hospitalization which, first and foremost, eliminates the opportunities. A prerequisite for undertaking either of these measures is that suicide-threatening individuals apply for help. The present paper addresses the individual's problem of whether or not to apply for help, as well as the therapist's problem of whether or not to hospitalize him. While the individual faces the risk of involuntary hospitalization, the therapist faces the risk of suicide. He thus conditions his hospitalization rule on the likelihood that the suicide threat is genuine, aiming to minimize society's expected loss from the possible suicide act and his efforts to prevent it. The paper analyzes the therapist-patient interaction within a simple game-theoretic framework, deriving both parties' equilibrium strategies and implications for long-run suicide prevention policy.

1. Introduction

Psychiatry guides and textbooks usually begin their suicide chapters by stating that suicide is a major public health problem [e.g., Kranjac (1992), Kaplan and Sadock (1993)].[1] An immediate implication of this statement is that suicide is also a major *economic* problem. Not only does suicide involve massive loss (some say 'waste') of human capital and quite often a financial blow to close survivors (whose life insurance policies do not hold for suicidal death), but suicide prevention measures require economic resources of alternative use. While protective hospitalization of every suicide-threatening individual would undoubtedly reduce suicide rates to a minimum, it is hardly a feasible economic solution. Economics suggests that the *expected* cost of losing one's life (where the value of life is weighted by the likelihood that the suicide threat is genuine) should be weighed against the cost of hospitalization so as to take account of the *overall* loss to society from suicide and suicide prevention. Suicide (the same as crime or fire) prevention is part of society's resource allocation problem.

Sociologists, psychologists and psychoanalysts have long been fascinated by the individual's self-destructive behavior, developing various theories to explain it [e.g., Durkheim (1897/1951), Menninger (1933), Freud (1948), Horney (1950), Henry and Short (1954), Shneidman and Farberow (1957), Gibbs and Martin (1964), Douglas (1967)].[2] Economists, however, have almost entirely ignored the phenomenon of suicide, despite its

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[1]According to government statistics, about 55,000 people in the US (nearly 13 out of every 100,000) deliberately kill themselves each year, a rate which has remained stable over the recent decade [Kranjac (1992)]. Most experts believe that the actual rate is substantially higher, perhaps closer to 75,000, because many suicide deaths are incorrectly listed as accidents or homicides. Internationally, suicide rates range from highs of more than 25 per 100,000 people in Scandinavia, Switzerland, West Germany, Austria, and Japan to fewer than 10 per 100,000 in Spain, Italy, Ireland, Egypt, and the Netherlands [Kaplan and Sadock (1993)].

[2]Sociologists have also investigated empirically the relationships between suicide and possible explanatory variables, the most common of which is unemployment [e.g., Vigderhous and Fishman (1978), Boor (1980), Platt (1984), Yang (1992)]

obvious economic ramifications (and the puzzling case of a consumer who prefers less of everything and uses his power and intelligence to execute this preference). A notable exception are Hamermesh and Soss (1974), who derived an economic model of suicide to explain (and empirically test) suicide which is motivated by economic distress.[3] Following the spirit of the epigraph to their paper,[4] Hammermesh and Soss argue that an individual will commit suicide if his discounted lifetime utility from consumption in excess of some (increasing with age) minimum level of subsistence *plus* a utility factor representing his 'taste for living', reach zero. Mercilessly, however, Hammermesh and Soss did not offer their suicidal individual a 'hot line' number to talk his problem over with a mental health professional, nor the option to apply to a suicide prevention center, which might help restore his 'taste for living' or equip him with more optimistic perceptions of his future subsistence needs. While people in economic distress may contemplate suicide, many are reluctant, hesitant and conflicted about it. They may maintain bits of hope and may attempt to seek last minute help. The fast development of community psychiatry during the past two decades has led to the emergence of short-term therapeutic techniques known as crisis therapy (or 'crisis intervention'), which aim to provide immediate treatment to people who find themselves on the verge of suicide, while allowing them to continue to live at home.[5] A crucial element of crisis therapy is the stressing of the likelihood of recovery and a speedy return to normal life. Suicide is considered to be preventable in most cases, if those at risk receive the psychological treatment they need.

Why is it then that not every suicide-contemplating individual applies for help? Aside of lack of information and disbelief in his ability to be helped, the major reason is fear of involuntary hospitalization. As argued by Kranjac (1992), the most important part of

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[3]There is also a one-page note by Kimenyi and Shughart (1986) who incorporated health care prices into the suicide decision, arguing that the lower the prices, the lower the cost of prolonging life through investment in health care; thus the lower the suicide drive.

[4]It reads: "as soon as the terrors of life reach the point at which they outweigh the terrors of death, a man will put an end to his life" [A. Schopenhauer, *On Suicide*].

[5]Crisis therapy is a brief form of psychotherapy, usually involving intensive face-to-face conversations during six to twelve sessions which focus on the immediate problem and the most disturbing symptoms. Aside from offering pragmatic solutions and emotional support, crisis therapy might also help improve the patient's capabilities to meet future challenges [see, for example, Shneidman (1973), Kardiner (1975), Marmor (1980), Budman (1981)].

treatment planning is an accurate assessment of the seriousness of the suicide threat. When the risk is judged to be serious, a therapist most often will recommend immediate hospitalization (where protection against suicide is assured), and, in case of refusal, might also hospitalize the patient involuntarily. While sharply restricting the patient's ability to commit suicide if dissatisfied with the progress of his therapy, involuntary hospitalization might also involve complementary somatic treatment (e.g., heavy medication, and/or electroconvulsive therapy) as well as demeaning safety precautions such as deprivation of normal clothing and personal belongings (and, in extreme cases, bed tying), which might well act to precipitate the patient's urge to die [see Goffman (1961)]. Still, the therapist's main concern in making his hospitalization decision is to eliminate the *opportunities* for suicide. As argued by Litman and Farberow (1976), the rationale underlying suicide prevention in hospitals is that for most patients the suicidal state is limited in time duration. If they survive for a period of time, they usually readjust and become nonsuicidal.

The present paper addresses the patient's problem of whether or not to apply for help in case of contemplating suicide, along with the therapist's problem of whether to hospitalize his patient or to offer him ambulatory crisis therapy. Involuntary hospitalization *is assumed to be the only deterrent to seeking help, yet the risk of hospitalization is not* exogenous to the patient's problem, but is rather determined through the interaction between the patient and therapist within a game-theoretic setting: the therapist is viewed as a strategic actor who conditions his hospitalization rule on the likelihood that the suicide threat is genuine (i.e., that the threat is made by a genuinely suicidal individual), whereas the patient is viewed as a strategic actor who conditions his help-seeking rule on the likelihood of being involuntarily hospitalized. While the patient faces the risk of hospitalization, the therapist faces the risk of suicide. However, since the therapist is not likely to hospitalize every suicide-threatening patient, the patient is not likely to always avoid help.

The model is not restricted to suicide motivated by economic distress. It takes as given the individual's death wish - irrespective of its origin - and assumes that the individual commits suicide if he chooses to avoid help or if help (given that he is not hospitalized) fails to be successful. After setting the formal structure (section 2), the paper proceeds to derive the individual's strategy (section 3), assuming that he chooses his help-seeking rule

so as to maximize the expected utility of his prospect. The therapist's strategy is derived thereafter (section 4), perceiving him as a social welfare agent who chooses his hospitalization rule so as to minimize the expected loss incurred to society from the possible suicide act and his efforts to prevent it. The properties of possible Nash equilibria (pure and mixed strategies) emerging as a result of the therapist-patient interaction are then considered, and the effect on equilibrium of various parameter changes is examined (section 5). The model's implications for long-run suicide prevention policy and some suggestions for future research conclude the paper (section 6).

2. The setting

Consider an individual for whom life has become (due to job loss, relationship breakup, illness in the family, etc.) intolerable and hopeless. Consequently, he is left with two alternative courses of action: seeking mental help (which might improve his competence to cope with the stressful situation),[6] and committing suicide (which will put an end to his suffering).[7] Suppose, however, that the individual fears that if he applies for help and tells a therapist about his suicide intentions (otherwise he obviously cannot be helped), the therapist might choose, if having the power and acting strategically, to hospitalize him against his will for his own protection. Forced hospitalization is assumed to be the worst outcome possible for the individual, as aside of subjecting him to compulsory and demeaning treatment would also deny him the freedom of action. His only hope lies in ambulatory crisis therapy (provided in an outpatient clinic or in a practitioner's private office), which, if unsuccessful, would not dismiss him of the option to execute his death wish.

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[6] In a general theory of suicide developed by Farber (1968), the probability of attempting suicide is inversely linked to the ratio C/T, where C denotes a sense of competence (i.e., a basic pervasive feeling in the individual that he has the resources within himself to cope with life difficulties), and T denotes the degree of threat leveled against the individual's ability to sustain acceptable existence.

[7] Lewin (1935) argued that normally a person has available to him, at any given time, some "space of free movement" (i.e., a number of acceptable courses of action from among which he may choose). In the psychological situation of suicide, however, the person faces a highly constrained space of free movement, which, in the absence of mental help options (i.e., when there appears to be no available path that might lead to a tolerable existence) reduces to the single course of self-induced death.

Suppose now that all therapists in the 'market' have hospitalization power. Still, some therapists would never consider making use of this power (as it contradicts their professional ethics and moral code), whereas others are strategic, in the sense that they would not hesitate to hospitalize a patient involuntarily if they assess that he is genuinely suicidal. Hence, the sequence of events underlying the therapist-patient interaction is as follows (Figure 1):

1. The patient, with probability λ, chooses to seek help; with probability $1-\lambda$ he chooses to commit suicide.
2. Nature, with probability r, determines that the therapist chosen by the patient is of a strategic type (r reflecting the fraction of strategic therapists in the 'market').[8]
3. The strategic therapist, with probability h, chooses to hospitalize the patient involuntarily; with probability $1-h$ he chooses to offer him ambulatory crisis therapy. If not of a strategic type, the therapist offers ambulatory therapy with certainty.
4. Nature, with probability θ, determines that the patient's treatment is successful.
5. The patient, if not successfully treated, commits suicide with certainty.

Mental health services (either hospitalization or ambulatory crisis therapy) are assumed, for simplicity, to be publicly funded (i.e., provided free of charge), and to have no stigmatizing effects. Suicide, if attempted, is assumed to be committed successfully. It cannot, by assumption, be attempted during hospitalization, which lasts until the suicide urge subsides.

3. The patient's strategy

Suppose that the patient's preferences over the three possible outcomes (ambulatory therapy, involuntary hospitalization, and suicidal death) are represented by the utility function $U = U(T, H, S)$, where: T - Therapy (1 - if successful, 0 - if not provided or unsuccessful), H - Hospitalization (1 - if hospitalized, 0 - if not hospitalized), S - Suicide (1 - if committed, 0 - if not committed), and, by assumption, $U(1,0,0) > U(0,0,1)$

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[8] In case that not all therapists in the 'market' have hospitalization power, r may reflect the fraction of therapists who have hospitalization power *and* act strategically.

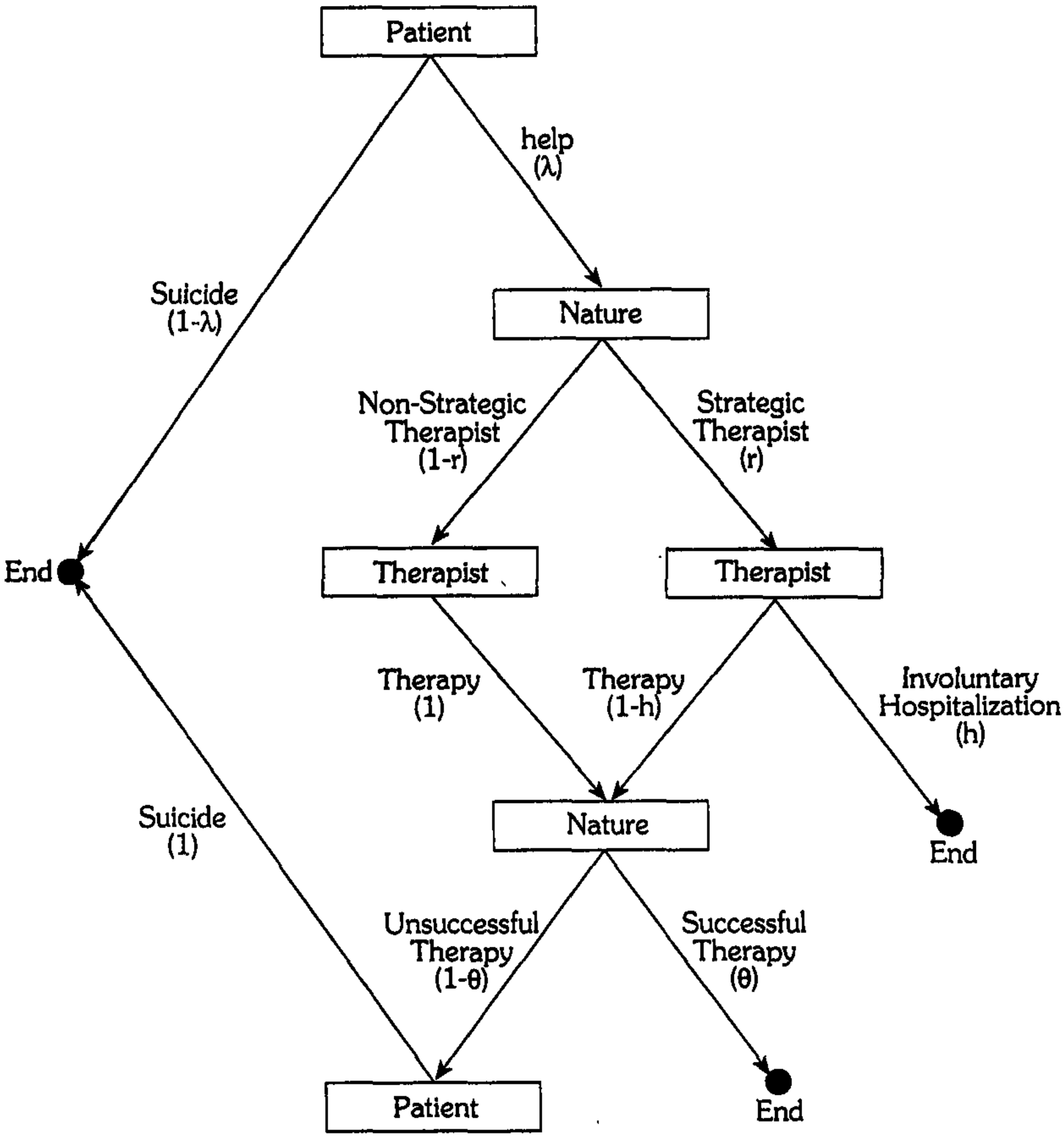

Figure 1: Therapist-patient decision tree

$> U(0,0,0) > U(0,1,0)$. Given any probability of hospitalization, h, used by a strategic therapist, the patient is assumed to choose a strategy (probability of applying for help), $0 \leq \lambda \leq 1$, so as to maximize the expected utility of his prospect

$$EU(\lambda, h) = \lambda\{rhU(0,1,0) + (1-rh)[\theta U(1,0,0) + (1-\theta)U(0,0,1)]\} + (1-\lambda)U(0,0,1). \quad (1)$$

Equation (1) states that if, with probability λ, the patient applies for help, then, with probability rh, he will be hospitalized, gaining the least desirable utility, $U(0,1,0)$. If, with probability $1-rh$, he is not hospitalized, his utility level depends on whether or not crisis therapy turns out to be successful. If, with probability θ, it is, he will gain the most desirable utility $U(1,0,0)$. If, with probability $1-\theta$, it is not, the patient will commit suicide, gaining the utility level $U(0,0,1)$, the same as he would if, with probability $1-\lambda$, he has chosen to forego the option of therapy in the first place.

The marginal benefit of applying for help, MB_λ, is

$$\frac{d(EU)}{d\lambda} = MB_\lambda = rhU(0,1,0) + (1-rh)\theta U(1,0,0) - [rh + (1-rh)\theta]U(0,0,1), \quad (2)$$

which decreases with h and r and increases with θ, but is independent of the patient's strategy, λ. Thus, the patient will apply for help (choose $\lambda=1$) if $MB_\lambda > 0$ and will commit suicide (choose $\lambda=0$) if $MB_\lambda < 0$. Defining h^* as the solution of (2) for $MB_\lambda = 0$, we have

$$h^* = \frac{\theta[U(1,0,0) - U(0,0,1)]}{r\{\theta[U(1,0,0) - U(0,0,1)] + U(0,0,1) - U(0,1,0)\}}, \quad (3)$$

implying that the patient's best response, $\lambda(h)$, to any possible strategy of the therapist is

$$\lambda(h) = \begin{cases} 1 & \text{if } h < h^* \\ 0,\ldots,1 & \text{if } h = h^* \\ 0 & \text{if } h > h^*. \end{cases} \quad (4)$$

Hence, the patient's best strategy is to apply for help only if the probability that a strategic therapist will hospitalize him is sufficiently low, and to commit suicide right away only if the probability of being hospitalized by a strategic therapist exceeds some trigger value h^*. The tendency to apply for help is greater (i.e., h^* is greater) the greater the probability of successful therapy, θ, or the smaller the probability that the therapist is of a strategic type, r. Also, the tendency to apply for help is greater the greater the utility from successful treatment, $U(1,0,0)$, or from forced hospitalization, $U(0,1,0)$, and the smaller the utility from suicide, $U(0,0,1)$,

When $\theta=0$, $h^*=0$ (if $r > 0$). Thus, as long as $h > 0$ and, consequently, some risk of involuntary hospitalization ($rh > 0$), (4) implies that $\lambda(h) = 0$, as there is no incentive to apply for help. However, if there is some chance for successful treatment ($\theta > 0$), h^* is positive. Thus, it is not necessary for h to be zero to induce the patient to apply for help (applying is desired for any $h < h^*$). Notice also that h^* may be greater than unity. This occurs when the probability that the therapist is of a strategic type is sufficiently small, so that the expected gain from applying for help, $(1-r)\theta[U(1,0,0) - U(0,0,1)]$, always exceeds the expected cost, $r[U(0,0,1) - U(0,1,0)]$. This implies that $MB_\lambda > 0$ even if $h = 1$, so that $\lambda(h) = 1$ for any h. Even though the patient expects a strategic therapist to hospitalize him with certainty, the fraction of strategic therapists in the 'market' is so low to worth the risk that the therapist is of that type.

4. The therapist's strategy

Suppose that the strategic therapist is a cost-oriented social welfare agent who bases his hospitalization rule on the seriousness of the suicide threat. Suppose further that only a fraction s of all suicide-threatening individuals in the 'market' are genuinely suicidal.[9] Hence, the therapist cannot be sure whether a given patient who has applied for help

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[9]McCulloch and Philip (1972) claim that throughout the world, the equivalent of the population of Edinburgh (or Helsinki) kills itself every year, and, in addition, in the same period of time, the equivalent of the population of London indulges in some form of non-fatal suicidal behavior. The parameter s could thus be assessed by the fraction: (population of Edinburgh) / (population of Edinburgh and London).

and is contemplating suicide is actually determined to die in case that his treatment turns out to be unsuccessful. Still, given any probability λ that a genuinely suicidal individual would apply for help, and given that non-genuine threateners, who constitute a fraction $1-s$ of the 'market', would *always* apply for help as (despite the demeaning nature of hospitalization) they should not fear the constraint that might be imposed on their ability to execute their non-genuine death wish.,[10] the probability that a patient who threatens to commit suicide is indeed suicidal is known to be $z(s, \lambda) = \lambda s/(\lambda s + 1-s)$.

Given this probability, suppose now that the therapist chooses a strategy (probability of hospitalizing the patient) $0 \leq h \leq 1$, so as to minimize the expected loss incurred to society from the possible suicide act and his efforts to prevent it

$$L(\lambda, h) = hC_h + (1-h)[C_t + (1-\theta)z(s, \lambda)F], \tag{5}$$

where C_h denotes hospitalization cost (over the time period required, on average, to cure inpatients of their suicidal drive), C_t - crisis therapy cost, and F - the social value of life, where, by assumption, $F > C_h > C_t$.[11] Equation (5) states that if, with probability h, the therapist hospitalizes his patient, society will bear a cost of C_h. However, if, with probability $1-h$, the therapist agrees to treat the patient, society first bears the cost of C_t. Then, if, with probability $1-\theta$, the treatment does not succeed, and if, with probability $z(s, \lambda)$, the patient happens to be genuinely suicidal, society will bear the additional cost associated with loss of life, F.

The marginal cost of hospitalization, MC_h, is

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[10]Formally, the preference order of a non-genuine threatener, for whom suicide is the worst outcome possible, is given by $U(1,0,0) > U(0,1,0) > U(0,0,0) > U(0,0,1)$. In case of not applying for help or of unsuccessful treatment, he would *not* commit suicide or would just "attempt" to commit suicide. In any case, h^* is bound to be greater than unity, implying that $h < h^*$, and thus $\lambda(h) = 1$.

[11]On the problem of valuing life and on the value of saving a life, see, for example, Mishan (1971), Jones-Lee (1976), Blomquiost (1981), and Broome (1985)]. Obviously, the therapist does not share the patient's feeling that his life has no value (although he may include in C_h the mental cost incurred to the patient from involuntary hospitalization), otherwise minimization of social loss would always obtain at a corner solution of h=0.

$$\frac{dL}{dh} = MC_h = C_h - [C_t + (1-\theta)z(s, \lambda)F], \tag{6}$$

which decreases with λ and s, and increases with θ, but is independent of the therapist's strategy, h. Thus, the therapist will hospitalize his patient (choose h =1) if $MC_h < 0$ and will offer him ambulatory crisis therapy (choose h=0) if $MC_h > 0$. Denoting λ^* as the solution of (6) for $MC_h = 0$, we have [substituting $z(s, \lambda) = \lambda s/(\lambda s + 1-s)$]

$$\lambda^* = \frac{(1-s)(C_h - C_t)}{s[(1-\theta)F - (C_h - C_t)]}, \tag{7}$$

where, by assumption, $(1-\theta)F - (C_h - C_t) \neq 0$. Denoting $\bar{\theta} = 1 - (C_h - C_t)/F$, (7) implies that if $\theta < \bar{\theta}$, λ^* is positive. Hence, the therapist's best response, $h(\lambda)$, to any possible strategy of the patient is

$$h(\lambda) = \begin{cases} 1 & \text{if } \lambda > \lambda^* \\ 0,\ldots,1 & \text{if } \lambda = \lambda^* \\ 0 & \text{if } \lambda < \lambda^*. \end{cases} \tag{8}$$

However, if $\theta > \bar{\theta}$, λ^* is negative, and the therapist's best response is reversed:

$$h(\lambda) = \begin{cases} 0 & \text{if } \lambda > \lambda^* \\ 0,\ldots,1 & \text{if } \lambda = \lambda^* \\ 1 & \text{if } \lambda < \lambda^*. \end{cases} \tag{8'}$$

In the former case, (8) implies that the therapist's best strategy is to hospitalize his patient only if the probability that a genuinely suicidal individual applies for help exceeds some trigger value, λ^*, and to offer ambulatory therapy only if the probability of a genuinely suicidal individual applying for help is sufficiently low. In the latter case, (8') implies that the therapist's best strategy is to offer ambulatory thearty if λ *exceeds* λ^*, and to

hospitalize if λ *falls short* of λ^*. Since λ cannot obtain negative values, it follows that $\lambda > \lambda^*$, and the best strategy is always $h(\lambda) = 0$.

Focusing on the case of $\theta < \bar{\theta}$, the tendency to hospitalize will be greater (i.e., λ^* is smaller) the lower the cost of hospitalization, C_h, or the probability of a successful treatment, θ, and the higher the cost of therapy, C_t, the social value of life, F, or the *fraction of genuinely suicidal individuals, s. In particular, when* $s = 1$, $\lambda^* = 0$. *Thus, as long* as $\lambda > 0$, and, therefore some chance that genuine suicidal individuals apply for help, (8) implies that $h(\lambda) = 1$. However, if not every suicide-threatener in the 'market' is genuine ($s < 1$), λ^* is positive. Thus, it is not necessary for λ to be zero to induce the therapist to treat his patient (crisis therapy is desired for any $\lambda < \lambda^*$). Notice also that λ^* may be greater than unity. This occurs when the fraction of genuinely suicidal individuals is sufficiently small so that the cost of hospitalization, C_h, is always greater than the expected cost of non-hospitalization, $C_t + s(1-\theta)F$. This implies that $MC_h > 0$ even if $\lambda = 1$, so that $h(\lambda) = 0$ for any λ. Even though the therapist expects a genuine threatener to apply for help with certainty, the fraction of genuine threateners in the 'market' is so low to worth the risk that the patient is of that type.

5. Equilibrium

In equilibrium, the therapist's and patient's strategies are best responses to each other, so that neither party has an incentive to change his strategy. Formally, equilibrium is characterized by a pair of strategies (λ^{eq}, h^{eq}) such that $\lambda^{eq} = \lambda(h^{eq})$ and $h^{eq} = h(\lambda^{eq})$. Combining the best response functions, $\lambda(h)$ and $h(\lambda)$, and recalling that h^* and λ^* may be greater than unity and that λ^* may be negative, four cases of interest emerge: (a) $\lambda^* > 1$, $h^* > 0$ (b) $\lambda^* < 0$, $h^* > 0$ (c) $0 < \lambda^* < 1$, $h^* > 1$ (d) $0 < \lambda^* < 1$, $0 < h^* < 1$ (Figure 2).

(a) $\lambda^* > 1$, $h^* > 0$: Since λ cannot exceed unity, it follows that $\lambda < \lambda^*$, and thus [from (8)] that $h(\lambda) = 0$. Hence, $h < h^*$ (regardless of whether h^* is smaller or greater than unity) and [from (4)] $\lambda(h) = 1$. Equilibrium is reached in pure strategies ($\lambda^{eq} = 1$, $h^{eq} = 0$),

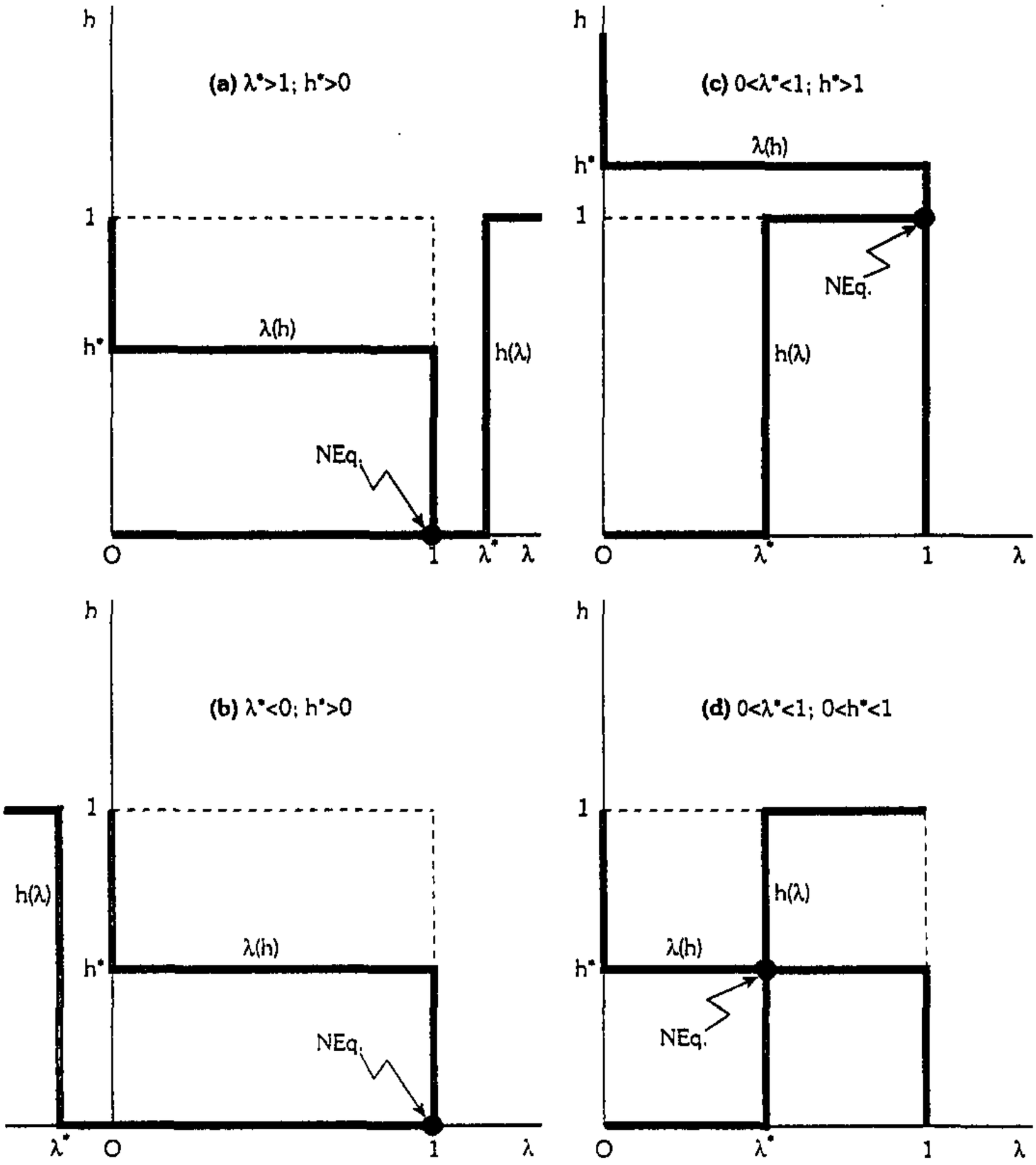

Figure 2: Therapist-patient equilibrium

the interesting implication being that the therapist avoids hospitalization although a genuinely suicidal individual applies for help with certainty. The reason for the no-hospitalization strategy is the low likelihood that the patient is genuinely suicidal.

(b) $\lambda^* < 0$, $h^* > 0$: Since λ cannot be negative, it follows that $\lambda > \lambda^*$, and thus [from (8')] that $h(\lambda) = 0$. Hence, $h < h^*$ (regardless of whether h^* is smaller or greater than unity) and [from (4)] $\lambda(h) = 1$. Equilibrium is reached in pure strategies ($\lambda^{eq} = 1$, $h^{eq} = 0$), the interesting implication again being that the therapist avoids hospitalization although a genuinely suicidal individual applies for help with certainty. However, the reason for the no-hospitalization strategy is the high likelihood that crisis therapy will succeed.

(c) $0 < \lambda^* < 1$, $h^* > 1$: Since h cannot exceed unity, it follows that $h < h^*$, and thus [from (4)] that $\lambda(h) = 1$. Hence, $\lambda > \lambda^*$ and [from (8)] $h(\lambda) = 1$. Equilibrium is reached in pure strategies ($\lambda^{eq} = 1$, $h^{eq} = 1$), the interesting implication being that the patient chooses to apply for help although a strategic therapist would hospitalize him with certainty. The reason for the no-suicide strategy is the low likelihood that the therapist is strategic.

(d) $0 < \lambda^* < 1$, $0 < h^* < 1$: Since neither λ^* or h^* exceed unity nor λ^* is negative, equilibrium can only be reached in mixed strategies ($\lambda^{eq} = \lambda^*$, $h^{eq} = h^*$), the interesting implication being that either party's strategy coincides with the other party's trigger value. The reason for the mixed strategy solution is that $\lambda(h)$ and $h(\lambda)$ take the values 0 or 1 interchangeably, except at their respective trigger values, λ^* and h^*.

Given a mixed strategy solution, the interesting question becomes the way by which possible parameter changes affect the equilibrium values, $\lambda^{eq} = \lambda^*$ and $h^{eq} = h^*$, and, in particular, the way they affect the patient's tendency to apply for help, λ^*, which is a prerequisite for suicide prevention. With the exception of a change in θ which affects *both* equilibrium values, a change in any other parameter affects one equilibrium value only (sometimes in a counter-intuitive way resulting from the equilibrium interactions between the parties):

(1) Hospitalization cost (C_h), crisis therapy cost (C_t), social value of life (F), and the fraction of genuine threateners (s) - a change in any one of these parameters affects the (equilibrium) probability of applying for help only, having no effect on the (equilibrium) probability of hospitalization. More specifically, an increase in C_h would increase λ^{eq}, whereas an increase in either C_t, F, or s would decrease λ^{eq}, leaving h^{eq} unchanged.

Consider, for example, an increase in hospitalization costs (C_h), which first decreases the therapist's tendency to hospitalize. This, however, increases the patient's tendency to apply for help, which in turn *increases* the probability of hospitalization. At the new equilibrium, there must be no incentive for either the therapist or the patient to make further adjustments of this sort. This happens when the probability of applying for help increases as much as to fully compensate the therapist for the increase in hospitalization costs (by making hospitalization more productive in terms of saving the lives of more genuinely suicidal patients), implying that the probability of hospitalization is unaffected in equilibrium.

(2) Utility from successful therapy [$U(1,0,0)$], involuntary hospitalization [$U(0,1,0)$], or suicide [$U(0,0,1)$], and the fraction of strategic therapists (r) - a change in any one of these parameters affects the (equilibrium) probability of hospitalization only, having no effect on the (equilibrium) probability of applying for help. More specifically, an increase in $U(1,0,0)$ or $U(0,1,0)$ would increase h^{eq}, whereas an increase in $U(0,0,1)$ or r would decrease h^{eq}, leaving λ^{eq} unchanged.

Consider, for example, an increase in the fraction of strategic therapists in the 'market' (r), which first decreases the patient's tendency to apply for help. This, however, decreases the strategic therapist's tendency to hospitalize, which in turn *increases* the probability of applying for help. A new equilibrium will be reached when the strategic therapist's tendency to hospitalize decreases enough to fully compensate the patient for the increase in the fraction of strategic therapists, leaving the probability of hospitalization (rh^{eq}) intact and the probability of applying for help unaffected in equilibrium.

(3) The probability of therapy success (θ) - a change in this parameter affects both the (equilibrium) probability of hospitalization and the (equilibrium) probability of applying for help. On the one hand, an increase in θ increases the marginal cost of hospitalization, which decreases the therapist's tendency to hospitalize. This increases the patient's tendency to apply for help, which in turn increases the probability of hospitalization, offsetting the initial effect of the increase in marginal cost. On the other hand, an increase in θ increases the marginal benefit of applying for help, which increases the patient's tendency to apply. This increases the therapist's tendency to hospitalize, which in turn decreases the probability of applying for help, offsetting the initial effect of the increase in marginal benefit. Overall, both λ^{eq} and h^{eq} increase following an increase in θ, each due to a change in the other party's set of incentives.

6. *Suicide prevention: conclusions*

Social health policy can do little to affect the *circumstances* that lead individuals to wish their own death. It might, however, prevent individuals from executing their death wish, either through modern crisis therapy which, if successful, eliminates the *drive* to die, or through protective hospitalization which, first and foremost, eliminates the *opportunities*. An obvious prerequisite for undertaking either of these measures is that suicide-threatening individuals apply for help. Thus, a crucial task of suicide prevention policy is to generate help-seeking incentives.

Potentially, the most effective measure of suicide prevention, involuntary hospitalization, is a deterrent to help-seeking. Indeed, a preliminary result of this paper is that if the hospitalization decision is exogenous to the individual's problem, the likelihood of applying for help is, as intuitively expected, inversely related to the likelihood of hospitalization: the lower the probability that a strategic therapist hospitalizes the patient, the greater the probability that he applies for help. However, an encouraging result of the paper is that once we allow for therapist-patient interactions, the disincentive role of the hospitalization decision subsides. In particular, as long as equilibrium is reached in pure strategies [cases (a)-(c)], a genuinely suicidal individual would apply for help with certainty - *irrespective of*

the therapist's strategy. In other words, for sufficiently low fractions of genuinely suicidal individuals or strategic therapists in the 'market', or for sufficiently high probability of therapy success, the threat of involuntary hospitalization would cease to constitute an effective deterrent to applying for help.

Moreover, not only does a sufficiently high probability of success ensure that the patient apply for help with certainty, but given that equilibrium is reached in mixed strategies [case (d)], an increase in the probability of therapy success increases the patient's tendency to apply for help - *even though the therapist's tendency to hospitalize increases as well.* Obviously, the increased threat of hospitalization is more than offset by the increased likelihood that crisis therapy will succeed. Hence, scientific exploration and refinement of new and improved psychotherapy techniques for effectively helping the suicidal individual, expansion of therapists' training in the use of improved techniques, and not less importantly, intensification of educational efforts through the mass media for informing the general public that modern crisis intervention is an antisuicide aid of potentially high success, widely available at suicide prevention centers, community clinics, or private practitioners' offices - are all essential keys to declining society's suicide rates. They *constitute, however, long-run measures of suicide prevention policy, which obviously affect* the short-run hospitalization / therapy decision. The extent by which they are undertaken should, of course, be subject to long-run cost-benefit considerations.

The model's predictions with regard to other possible policy measures are less encouraging. Restricting hospitalization power to selected therapists (which may be captured in the model by a decrease in r) would increase, as intuitively expected, the patient's tendency to apply for help providing that the risk of involuntary hospitalization is exogenous to his problem. Given an interactive framework, a sufficiently low fraction of therapists with hospitalization power would result in a pure strategy equilibrium at which the patient applies for help with certainty. However, as long as equilibrium is reached in mixed strategies, an increase in the fraction of therapists with hospitalization power would have no effect on the equilibrium tendency to apply for help, increasing only the therapist's tendency to hospitalize. Alleviating mental hospitals' strict surveillence rules or involuntary somatic treatments (which may increase the patient's utility from involuntary

hospitalization) would also, counter-intuitively, have no effect on equilibrium help-seeking behavior.

A simplifying assumption of the model is that suicide, if attempted, is committed successfully. A possible extension of the model is to relax this assumption, allowing for the possibility that the suicide attempt might fail, in which case the individual will be hospitalized with certainty (as mental health regulations very often require). Consequently, a decision to commit suicide would also be subject to uncertainty, the same as the decision to appy for help. The individual would then face the (interrelated) problems of whether or not to apply for help, and if not, of whether or not to attempt suicide. The therapist would know that the patient should not necessariliy choose to kill himself (and if he tries - should not necessarily succeed) in case that his treatment turns out to be unsuccessful, and the patient would know that the therapist knows. Intuitively, this might decrease the tendency to hospitalize and increase the tendency to apply for help. Another possible extension of the model is to let the hospitalization decision be made by a central mental health authority (to which individual therapists report the whereabouts of their suicide-threatening patients), which aims at minimizing society's expected loss from suicide and suicide prevention of *all* suicidal patients. Such an approach would allow for the determination of the optimal number of suicides in society, which, under increasing marginal costs of suicide prevention, is likely, regrettably, to be greater than zero.

REFERENCES

Blomquist, G., 1981, "The value of human life: An empirical perspective", *Economic Inquiry*, 157-164.

Broome, J., 1985, "The economic value of life", *Economica* 52, 281-294.

Boor, M., 1980, "Relationships between unemployment rates and suicide rates in eight countries, 1962-1976, *Psychological Reports* 47, 1095-1101.

Budman, S. H., 1981, *Forms of Brief Therapy*. New York: Guilford Press.

Douglas, J.D., 1967, *The Social Meaning of Suicide*. Princeton N.J: Princeton University Press.

Durkheim, E., 1897, *Le suicide*. Paris: Felix Alcan (English version: 1951, *Suicide: A Study in Sociology*. Glencoe, Ill.: The Free Press).

Farber, M.L., 1968, *Theory of Suicide*. New York: Funk and Wagnalls.

Freud, S., 1948, "Mourning and melancolia", in: *Collected Papers* Vol. IV. London: Hogarth Press.

Gibbs, J.P., and W.T. Martin, 1964, *Status Integration and Suicide*. Eugene, Oregon: The University of Oregon.

Goffman, E., 1961, *Asylums*. Garden City, New York: Anchor Books.

Hamermesh, D.S., and N.M. Soss, 1974, "An economic theory of suicide", *Journal of Political Economy* 82, 83-98.

Henry, A.F., and J.F. Short, 1954, *Suicide and Homicide*. Glencoe, Ill.: The Free Press.

Horney, K., 1950, *Neurosis and Human Growth*. New York: Norton.

Jones-Lee, M.W., 1976, *The Value of Life: An Economic Analysis*. Oxford: Martin Robertson.

Kaplan, H.I., and B.J. Sadock, 1993, *Synopsis of Psychiatry*. Baltimore: Williams and Wilkins.

Kardiner, S.H., 1975, "A methodological approach to crisis therapy", *American Journal of Psychotherapy* 29, 4-13.

Kimenyi, M.S., and S.F. Shughart II, 1986, "Economics of suicide: Rational or irrational choice, *Atlantic Economic Journal* 16, 121.

Kranjac, T., 1992, "Suicide", in: I.K. Frederic, J.M. Oldham, and H. Pardes (eds.), *The Columbia University College of Physicians and Surgeons Complete Home Guide to Mental Health* . New York: Henry Holt and Company.

Lewin, K., 1935, *Dynamic Theory of Personality*. New York: McGraw-Hill.

Litman, R.E., and N.L. Farberow, 1976, "Suicide prevention in hospitals", in: E.S. Schneidman, N.L. Farberow, and R.E. Litman (eds.), *The Psychology of Suicide* , New York: Jason Aronson Inc.

Marmor, J., 1980, "Crisis intervention and short-term dynamic psychotherapy", in: H. Davanloo (ed.), *Short Term Dynamic Psychotherapy*. New York: Jason Aronson.

McCulloch, J.W., and A E. Philip, 1972, *Suicidal Behaviour*, New York: Pergamon Press Inc.

Menninger, K. A., 1933, "Psychoanalytic aspects of suicide", *International Journal of Psychoanalysis* 14, 376.

Mishan, E.J., 1971, "Evaluation of Life and Limb: A theoretical approach", *Journal of Political Economy* 79, 687-705.

Platt, S., 1984, "Unemployment and suicidal behavior", *Social Science and Medicine* 19, 92-115.

Shneidman, E., 1973, "Crisis intervention: some thoughts and perspectives", in: S. Clabonn (ed.), *Crisis Interventions*. New York: Behavior Publications.

Shneidman, E., and N. Farberow, 1957, "The logic of suicide", in: Shneidman, E., and N. Farberow (eds.), *Clues to Suicide*. New York: McGraw-Hill.

Vigderhous, G., and G. Fishman, 1978, "The impact of unemployment and family integration on changing suicide rates in the USA, 1920-1969", *Social Psychiatry* 13, 239-248.

Yang, B., 1992, "The economy and suicide: A time series study of the USA", *American Journal of Economics and Sociology* 51, 87-99.

ניתן להזמין פרסומים במוסד לביטוח לאומי, מינהל המחקר והתכנון,
שדי ויצמן 13, ירושלים 91909, טל. 6709579(02)

ח.מ. 9701 520066.7