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QAT USE IN NORTH YEMEN AND THE PROBLEM OF ADDICTION: A STUDY IN MEDICAL ANTHROPOLOGY

ABSTRACT. Travelers to North Yemen nearly invariably report that Yemeni people are universally addicted to the drug qat and that the problems of the country are related to this. On the other hand, the majority of Yemenis claim that qat is not only harmless, but that it has many virtues. After describing the chemistry of the drug and the customs of use, this paper addresses the question of the concept of addiction in terms of data gathered during an extensive field study of qat use. Questions of latency, tolerance and availability are discussed, while particular attention and data are devoted to an examination of the "analgesic hypothesis." It is concluded that a more complex theory is needed to deal with drug "dependencies" and that social and cultural perspectives must be added to concepts of the physiological and psychological effects of drugs if progress is to be made toward understanding institutional drug use such as is found with regard to qat.

INTRODUCTION

Carsten Niebuhr, the great traveler sent to Arabia by the King of Denmark in the mid-18th century, recorded the widespread use of qat in Yemen, and nearly every visitor since that time has commented on the ubiquity of this Yemeni "national drug." A preliminary visit to Yemen by the first and second authors of this paper in 1972 impressed us that the reports of the travelers are not exaggerated. Walking through the busy qat markets, which are found in every town of any size, we were assailed from all sides by merchants waving green leafy bundles in our faces. "Yemeni whisky" was the gleeful call, "Chew this and see your home in America!" or "This is our oil." We later found that this last phrase referred to the fact that Yemen has no oil at all, but that qat brings in considerable revenues to the merchants who sell it, and to the farmers who grow it. They regard qat as a basic resource.

We were invited into many houses by the hospitable Yemenis, and if our visit was in the afternoon, we would be given generous amounts of the qat leaves to chew. Our hosts were proud of their qat, and they wanted us to appreciate it, too. We soon learned that the majority of the Yemenis chew the tender leaves of this plant, known botanically as *catha edulis Forskal*, and that they generally claim to derive great satisfaction and enjoyment from the practice. However, outsiders have been nearly unanimous in considering the people of Yemen to be massively "addicted" to the drug, and the country's social, economic and health problems are frequently attributed to the qat habit. The following quotation from Dorothy Ingrams, the wife of a British administrator in Aden who visited Yemen is typical:

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They might have been a far more prosperous community than the Hadhramis as they lived in a fertile country, but there was at that time no apparent desire to leave the Middle Ages for the twentieth century and benefit from the know-how of other countries. One reason for this apathy of the average Yemeni was, I am sure, due to their addiction to *qat* (catha edulis), the most debilitating time-wasting scourge of Yemen. The leaves of the shrub are chewed to give the addict a feeling of being on top of the world, of being able to solve all problems, but the after effects are lassitude, apathy, and depression. Every Yemeni who could afford it, and most of them got a hold of *qat* somehow, spent the afternoons with his friends chewing, spitting, drinking water and chewing again. These sessions inspired a great deal of talk but no action and I saw no possibility of Yemen developing into a prosperous country so long as *qat* was allowed to exhaust the people's talents and sap their vitality (D. Ingrams 1970:113).

Many travelers have used similar language, and most of them, like Mrs. Ingrams, do not hesitate to employ the word "addiction," (e.g., Bury 1915; Rihani 1936; Helfritz 1936; Farrago 1938; and Shaffer 1952).

The FAO/WHO/UNICEF report in 1971 from the People's Democratic Republic of Yemen echoes the travelers' opinions, but does not cite any studies of the subject in support of its clear-cut conclusion that:

Qat, unlike coffee, has an overwhelming power on its consumer. It is extremely difficult for a qat chewer or addict to give it up as long as it remains within his reach (1971:1).

We could find no basis in research for such statements because there was none. They reflect only the Westerners' prejudice about drugs, in addition to the fact that qat is evident everywhere in Yemen, and provides a major focus of interest to a high proportion of Yemenis. No matter how many such opinions accumulate, even in scientific circles, it becomes apparent that we are still left at the same anecdotal level of knowledge.

The profound divergence of perception between the Yemenis and their foreign visitors on the subject of qat was the starting point for our study. We decided that the widespread, even "institutionalized" use of the drug which we observed, coupled with this discrepancy of opinion between users and "experts" created an obvious need for close investigation. Therefore, in 1974 we returned to make an extensive socio-medical study of qat use in Yemen. However, before turning to a discussion of some of the results of that study it might be well to satisfy the readers' curiosity about the constituents of this drug.

THE CHEMISTRY OF QAT

Beginning in the later 19th century and continuing to the present, nearly all the studies done on qat narrowly focused on its chemistry, attempting to isolate the active ingredients of the plant. However, this work, prior to the 1970's was somewhat confused and contradictory because of the transportation difficulties from the Red Sea area to Europe. All experiments had to be performed on dry

leaves, and some of the subtle and volatile ingredients which are apparently only present in fresh qat were not adequately isolated. Additionally, biochemical techniques for the more fine-grained analyses which appear to be necessary were not yet developed prior to that time.[1]

Since the 1930's the only generally accepted "active ingredient" in qat was (+)-norpseudoephederine, which was named cathine. There was evidence of other nitrogen-containing and possibly active compounds which were called cathedine and cathinine, but neither of these could be characterized adequately enough to satisfy most researchers in the field.[2]

The WHO Commission on Narcotic Drugs had been receiving reports on qat and its use since 1946, but because of the ambiguous reports of its biological and social effects, as well as the confusions in the evidence regarding its chemistry, attempts to place it on lists of dangerous and banned drugs failed. Little was done beyond gathering information and making recommendations to study the problem. Finally, at the 25th session, it was decided to initiate new studies of qat's chemical compounds at the WHO laboratories in Geneva, and these were begun in the early 1970's.

Faster transportaion has been made possible by newly opened airlines to the countries of the Red Sea area. This, coupled with the development of new techniques of extraction at the point of origin and the perfection of freeze-drying, has enabled researchers to work with plant material in which at least some of the more volatile ingredients are preserved. The WHO analysis, along with that from three other laboratories which nearly simultaneously began working on this problem, have now shown qat to be of more complex chemical structure than was previously thought.

To briefly summarize, these studies have revealed the following: (1) A new compound called "cathinone" or (–)-S amino propriophenome seems to be at least one of the suspected elusive "other" active ingredients which are lost when qat is dried. This compound has similarities to both (+)-norpseudoephedrine and to d-amphetamine, but it also has some properties different from each of these. (2) More than 40 other alkaloids have been detected, and many of them isolated. This class as a whole is called "cathedulin" (U.N. Narcotics Laboratory Report GE 79-10365 1979:8–9; Braenden 1979). This work is still in progress and is so recent that modern experiments of clinical effects of extracted "pure" substances are only now being carried out. Work with rats and monkeys is showing that Cathionone produces stimulation of central nervous system functions which is similar in many ways to d-amphetamine and cocaine. Generally, heart rates, locomotor activity and oxygen consumption are increased. In rats, cathinone had a reinforcing effect comparable to that of d-amphetamine. Monkeys stimulated themselves with cathinone in 24-hour cycle "spree" type patterns (Yamagita 1979:2), and in cocaine-habituated monkeys, cathinone maintained previously

established food reinforcing schedules at significantly higher levels than did cocaine or d-amphetamine (Schuster and Johanson 1979:1–2).

An interesting aspect of cathinone is that it does not seem to work through the same brain mechanism as does d-amphetamine, i.e., by creating an agonist effect on dopamine neurons. Therefore, although it produces some other (as yet undefined) brain process, it seems *less* capable of disrupting behavior (Knoll 1979; Rosencrans et al. 1979; Yamagita 1979; Schuster and Johanson 1979).

The import of all this generally supports Halbach's earlier conclusion (1972) that the clinical effects of qat are very similar to those of amphetamines, though somewhat weaker, but we seem to be on the threshhold of new discoveries on the psychopharmacological properties of qat. It should also be noted that it has long been established that qat contains a number of tannins and these are often assumed to be responsible for most of the gastric problems reported in connection with its use. A final health-related finding which should be remembered when assessing the health effects of qat use is that the leaves contain significant amounts of Vitamin C. One analyst was led to conclude that:

> Depending, of course, on the quantity consumed, the ancient custom of qat chewing in Arabia may be inadvertently supplying the people of that country with some of their daily requirement of ascorbic acid (Mustard 1952:34).

OUR STUDY

Because of the flurry of interesting studies going on relating to the chemistry of qat, we did not include such a component in our study. Yet our research concerns were far broader than the question of addiction, which we address in this paper. The goal was to gather data which would enable an assessment of the major effects of this "institutionalized" drug upon the social life, the economics, and the health of the Yemeni people.

Between 1974 and 1976, the research team worked primarily in the three largest North Yemeni "cities" of Sanaa (population 138,000), Taiz (134,000), and Hodeida (83,000). The core of the study was a combined sociological and health survey in the three cities mentioned which we call the "Chewer Survey." This was not epidemiological because, particularly given the lack of any population statistics on Yemen at that time, epidemiology was impossible without much greater resources than we possessed. Instead, the research design was based upon frequency, heaviness and length of chewing, which we hypothesized would be associated with various health and economic results.

The sample of 439 males and 364 females was nearly equally distributed between the three cities and their environs, and for field purposes was selected from four major categories: heavy, moderate, light and non-chewers. In addition to the basic questions pertaining to social and economic information, each

respondent was asked about qat-using patterns, his/or her history of chewing, and attitudes about the drug. Each was then given a physical examination, and elementary laboratory tests were made on blood (red blood cells, hemoglobin); urine (albumen, sugar). On the basis of this information we have been able to classify the sample into economic categories and health categories, in addition to the basic use (or "chewer") categories.[4]

Around the core survey were grouped a number of studies: (1) Psychophysiological testing was done on a sub-sample of 61 males as they chewed for a normal four-hour period. In this we monitored EKG, EEG, EMG, pulse, blood pressure, eye pupil size, body temperature and room temperature, besides administering a number of simple psychological tests before and during chewing. (2) Economic studies were done on the agriculture of qat, marketing of it, and prices. These were supplemented by the collection of government records on qat taxes. (3) A Youth Survey was made of attitudes of a group of University of Sanaa students and some young government workers. (4) A survey of attitudes of a small sample of 22 Western-trained Yemeni doctors. (5) Participant observation was carried out in more than 150 qat sessions. The results of all this work are still in the process of being analyzed, and a full account of the methodology used will be provided in the monograph being prepared. We are not going to deal with all aspects of our study in this paper, nor will we make overall assessments of the effects of qat on health or social life at this time. Our purpose here is rather to focus more specifically upon "addiction," as this concept may or may not apply in the Yemeni context. A central question we ask is: Does the widespread devotion of time, money and activity to qat imply mass drug "abuse" or "addiction" to qat in any precise sense? The attempt to deal with this leads us into the exploration of a number of complex interrelated topics. The job is not made easier by the circumstance that conceptions of drug "addiction" are still at a rather elementary level and often seem somewhat confused.

BACKGROUND

Owing to the general lack of knowledge about Yemen and the drug qat, a brief overview of the general context of the study will be helpful to the reader. The Yemen Arab Republic, often called "North Yemen," is situated near the southwestern tip of the Arabian Peninsula. It is bordered on the North and Northeast by Saudi Arabia on the Red Sea, and on the South and Southeast by the People's Democratic Republic of Yemen (formerly the Crown Colony of Aden). The majority of its more than five million inhabitants live in the mountainous part of the country formed by a rugged north-south running range which has some peaks nearly reaching the 13,000-foot level. This highland region enjoys a moderate climate due to the monsoon winds which bring two rainy seasons, allowing its many *wadis* and densely terraced mountainsides to be effectively cultivated.

Parallel with the mountains to the west is a flat plain some 20–50 miles wide, called the *Tihama*. A hot and humid Red Sea climate prevails in this coastal region and both the racial constitution and cultural practices of the people there show strong African and Indian influences.

On the eastern side of the central mountain chain, high plains and mountains of the volcanic type are cleft by wadis draining south-eastward which gradually fade into the famous Arabian Desert, the *Rub al Khali*.

The militant tribesmen of the northern mountains of Yemen are divided into several tribal confederations, all belonging to the division of the Shi'a Islamic sect called Zaydis. Until the revolution of the 1960's, the Imam or King of the Country was a Zaydi drawn from the Sayids, descendants of the Prophet Mohammad, a minority who have long lived among the tribesmen as a protected nobility. Sanaa, the capital, is located in this northern tribal region.

Tribal affiliations are less important among the peasant farmers living in the portions of North Yemen south of Sumara Pass and along the Tihama coast. People of these regions belong to the Shafi sect of the Sunni School of Islam, and this gives them a closer similarity to the majority of the Middle Eastern world. Hodeida, another of our research sites, is located on the Tihama Coast, while Taiz is at 4000-feet elevation in the southern Shafi section of the country.[5]

Several million people regularly chew qat leaves in most of the countries around the Red Sea. The Arabic name of this plant is *qat* and in most dialects of North Yemen it is pronounced gat.[6] In Harrar Province of Ethiopia, and in Somali, the most common name for it is *chat*. In Kenya the drug is commonly used in the northern Meru Province, but it is also chewed by many Muslims in cities and towns throughout the country. Among the numerous tribal names for the plant throughout East Africa south of Ethiopia and, the most common are *miraa* and *marongi*. The plant is known in Tanzania and other places further south in Africa as well as Madagascar, but, in addition to the Yemen Arab Republic, extensive institutionalized use as a recreational drug by whole population groups seems confined to parts of Ethiopia and, Kenya. It is banued in the People's Democratic Republic of Yemen (PDRY), where it is still used surreptitiously in many parts of that country. Saudi Arabia has instituted harsh sanctions against both trade and use.

There is considerable folklore evidence that the origin of qat, like that of coffee, was Harrar, Ethiopia. Tradition has it that both qat and coffee were brought from Ethiopia to Yemen by Shaykh Shadhili 400 years ago (El Mahi 1962; Rodinson 1977). However, the historical evidence is more clear that coffee was carried to Europe from the Yemeni Port of Mocha in the 16th century. The dry, transportable coffee beans could easily endure the long sea voyage, but the leaves of qat must be chewed fresh within 24 to 36 hours, so it never became well known outside the Red Sea region.

In North Yemen, qat grows principally between elevations of 3500 and 8000 feet, and it is a major commercial commodity within the country. Every city and town of any size has a part of the market set aside for the vigorous trade of the drug, and there are extensive networks of mobile merchants transporting it by Toyota truck to all areas of the country. The government derives considerable revenue from taxes on the growth and sale of qat, and thousands of Yemenis augment their precarious incomes by growing it on part of their land.

Use Pattern in Yemen

There are no good epidemiological data, and the best available information we have on the distribution of qat use in North Yemen comes from a study made by Mancioli and Parrinello, two Italian physicians who worked in the Taiz Municipal Hospital between 1955 and 1967. During a 12-year period, they g[illegible]d data on 27,410 patients (15,501 males and 12,359 females). They did n[illegible]ete geographic data on the origins of their respondents, but say [illegible]out 30% were originally from the Taiz region. Their sample probably constitutes a fair representation of the Yemeni population south of Sanaa, excluding the Tihama and the Eastern deserts, but it cannot be taken as representative of the country as a whole.

According to their classifications, 60.26% of the men and 34.91% of the women they interviewed were what they called "habitual" users. They had chewed daily for long periods in their lives. The other "occasional" users made up 30.43% of the males and 23.63% of the females who chewed only on holidays and special occasions such as weddings and funerals, or on sporadically occurring, tiring jobs.

According to our observations, these figures are probably a fairly accurate picture for the country, but assisted by new roads and many imported cars and trucks, chewing has become increasingly popular in many regions where it was relatively unknown. More women now chew regularly than in Mancioli and Parrinello's time, and there is an intermediate group which chews one or two times per week on a regular basis.

Whatever the true epidemiological figures on qat use in Yemen may turn out to be, it is evident that the use of this drug is now as much an intrinsic part of Yemeni culture and social life as are alcohol, tobacco and coffee in the life of the Western world. Such a situation naturally raises the question: How does qat compare to such other commonly-taken drugs? Is it more harmful to health and social life than these? In our larger study we will attempt to answer these questions, but the narrower problems we want to address here are: to what degree may we regard qat as "addicting," and, in general, what might massive long-term use of a drug like this possibly tell us about the behavior we call "addiction"?

THE QAT SESSION

Throughout North Yemen, qat chewing provides the major motivation for people to gather together. Qat use is an integral and important part of all major ceremonial occasions such as weddings, funerals and religious holidays, and in any town or village there are generally some houses at which sessions are held on a regular daily-or-weekly basis. A room called the *muffraj* is specially furnished for chewing in the houses of the wealthy, while in all other houses the common sitting room is often used for the purpose. In the northern part of the country, the *muffraj* is generally on an upper story of a multiple-story dwelling, enabling the chewers to look out over the town or countryside as the shadows of late afternoon deepen. In the southern areas, this pattern is also found, but more often the *muffraj* is on the ground floor. Formal qat chewing is strictly sex-segregated and in the women's sessions (*tofrita*), there is usually less qat.[7]

Men generally begin gathering between 2:00 and 3:00 P.M. Custom dictates that for best results a large meal be eaten before chewing, so most of them have dined. Each carries his own bundle (*robda*) of qat, which may be wrapped in sheet plastic or grass of the region to preserve its freshness. In the cities it has been purchased earlier at the market, but if the session is in a rural area where qat is grown, individuals may bring some from their own trees, or a *robda* bought from a neighbor.

Each guest greets the group as he enters, and they reply. Sometimes, particularly if the person has been away, or is there for a special purpose, he makes a circuit of the *muffraj*, shaking hands with each already seated guest. He then looks over the room and perhaps is beckoned to a particular place by the host. Carefully he removes his *jambiyya* belt,[8] and hangs it on a hook on the wall above. He also hangs up his outer cloaks and coat and his rifle and bandolier, if he has one. He is now prepared to relax, and sinks down into his place on one of the low, mat-like cushions which line the walls of the room. He sits with one knee raised and rests his arm on one of the firm movable pillows called a *medka*. The word *medka* also is one of the terms used to refer to the entire chewing session.

After untying his bundle of qat (*robda*), the chewer draws out a branch of qat and carefully inspects it to ascertain where the most tender leaves are. He may professionally tap the branch two or three times against his other hand to remove any gross foreign matter before he begins to carefully pluck each leaf, rubbing the dust from it with thumb and forefinger. He then places it carefully in his mouth. He continues the process of cleaning, picking, and putting leaves in his mouth at a regular pace. The most common term used for chewing qat is *khazzin*, which means "to store." This is appropriately descriptive, for the

chewer is indeed storing the green leaves in his cheek which soon begins to swell. In Yemen, only the juice is swallowed.

The host of a qat session can usually be found sitting in one corner, away from the door. The higher-status guests are grouped near him in favored positions along the wall facing windows. There is no strict enforcement of this seating placement, but a frequent pattern finds lower-status guests, neighbors and servants sitting near the door, while people of intermediate social position and younger men are ranged with their backs to the windows. Exposure to possible drafts and a less favorable view makes these positions less desirable. Preferably, the room is hot, stuffy and smoke-filled.

In the center of the floor on Persian or bedouin rugs are one or two large shiny brass trays with large elaborate Indian-made water pipes (called *madah*), for smoking is an essential accompaniment to qat chewing. The water-containing coconut vessels of these pipes are encased in elaborately carved and filigreed brass. On their high slender necks, loosely coiled, are the long hoses, sheathed in brightly colored cloth. The tall pipes are each crowned with a clay cone (*burrie*) containing the tobacco and charcoal which glows brightly with each long bubbling puff. One of these *madahs* is generally shared by two to six men during a session, but nowadays, many men smoke cigarettes. Still, the water pipes, symbolic of the comfort and pleasure associated with chewing, are nearly always in evidence.

Qat has a mildly astringent quality and cool water is drunk every few minutes while chewing. Like smoking, this is one of the essential pleasures of chewing. Ordinary water tastes unusually fragrant after the qat, but its natural sweetness is often enhanced by incense. To accomplish this, the containers are held upside-down over special incense (*bokhur me*) before being filled with water. Spittoons (*matfal*) made of shining brass or dull aluminum, are distributed within reach of every two or three guests. These are used for rinsing the mouth and to receive the used qat at the end of the session.

Qat sessions are theoretically open to all comers and custom does allow a degree of social mixture. Considerable mingling of social classes takes place, particularly in the villages, but the forces of status and interest increasingly militate against such openness. The trend is more and more toward general group uniformities in chewing patterns. For example, at sessions held at homes of wealthy merchants or important political figures, some poorer men from the immediate neighborhood still may be found clustered near the door, but most of the guests tend to be of nearly equal status. As the processes of social change in Yemen continue to accelerate, we expect to find more sessions composed primarily of like-minded people: religious men, intellectuals, clerks, craftsmen, laborers, young European-educated bureaucrats, etc.

The vast majority of Yemenis chew primarily in group sessions, but many also use the drug outside of such sedentary contexts. Hard laborers, such as

those who chip stones for buildings claim that qat energizes them for their work, as do the farmers, construction workers, and other day workers. Several stonecutters told us that they cut one or two stones in the morning before their qat, but six or eight while chewing in the afternoon. They could not chew in the morning because the fresh qat had not come in from the countryside. Many merchants chew all afternoon as they sit in their small stalls, while taxi drivers often chew almost constantly to remain alert. Villagers who hike daily up the steep Yemeni mountains to and from their fields nearly all claim that qat refreshes them and provides energy for climbing.

Qat is known to reduce the appetite for food, to drive away sleep, and to affect sexual activity. However, the important point to emphasize for the present discussion is the extremely social nature of the drug. When asked why they use the drug, Yemenis nearly always speak of the lack of entertainment and recreational alternatives in the country, and they remark that qat chewing provides the reason for nearly all social gatherings. Informants uniformly agreed that chewing enhances individual feelings of sociability which they value.

At the beginning of a session, conversation usually involves the entire *muffraj*. News and gossip are passed and jokes are told or a well-known speaker or storyteller may set the whole group laughing. In sessions organized for weddings or other festive occasions an oud player or other musician usually provides music, or men may dance a *jambiyya* dance to recorded music from cassette players or radios. Frequently, spirited arguments occur, but never have we seen any violence in a qat session.

After chewing for about an hour or sometimes less, many individuals attain a state they call *kayf*, an elevation of mood during which the chewer feels not only optimistic, confident and active, but alert and highly attuned to the subjects of conversation. A few individuals who chew a substantial amount in a short time become so animated that a kind of logorreah occurs; their tongues cannot keep pace with their thoughts and this creates a disconnected quality to their speech. This sometimes occurs on a group level, but often it is confined to one or two people or does not occur at all.

Many sessions are meetings of special interest groups and in these the topic may be something confidential or secret, such as political action or a business transaction. In others, the group may wrestle through a complex set of intellectual or legal intricacies concerning some local dispute, or perhaps argue some theological question in great depth. A conversational theme emerges which may be developed for as long as an hour or more. This may concern a current world event, a set of historical incidents (perhaps something which occurred during the Prophet Muhammad's time), a theological., etc.

We do not wish to imply that much trivial conversation does not occur in qat sessions, but only to indicate that a condition of high mental concentration and

focus on a single topic is often achieved by all members of a group. The attainment of this high level of group communion appears related to the use of the drug, as Yemenis believe.

As the session proceeds beyond two-and-a-half to three hours, the noise level begins to diminish. A mood of reflective quietude settles over the occasion. As shadows lengthen, it becomes "Solomon's Hour," a time of contemplation and rumination. Many low-voiced, dyadic conversations may be observed, and some individuals sit quietly, their glowing eyes giving evidence of the seething thoughts within. There may be some fatigue from the hours of talk, but the chewer does not feel less stimulated; there is only a turning inward of racing ideas and plans. Thoughts often eventually turn to plans that have failed or to difficult problems, but they may also move in a positive direction. Grandiose ideas for the future frequently are mentally worked out in great detail.

At some point, usually after some three-and-a-half or four hours have elapsed, individuals begin to rise, and, with a barely audible, "*Salaam Alaykum*," leave the room, replace their shoes, and go quietly out into the evening. Some go to a mosque for the evening prayer, while others return home, or detour to the houses of friends for post-session gatherings. Tea or *qishr* (tea made from coffee husks) may be served to the last few guests remaining in the *muffraj*, but most people later take these or milk at home, believing that they help to diminish any bad aftereffects of the qat. Whisky tends to be more and more the choice (if it can be afforded), because it is believed most effective in countering the insomniac effects.

CONCEPTS OF "ADDICTION"

At the more extreme end of the scale of common concepts of addiction is the one based upon the model of opiates. This is the theory that some substances produce biologically-based "cravings" which create strong motivations and consequent behavior to satisfy them. "True addiction" in this framework is signaled by the experience of physical "withdrawal symptoms" when the drug is withheld from the habitual user. A concommitant feature is "tolerance," and the idea is that as the body becomes accustomed a continuously increasing need is felt for more of a substance, with consequent driven, "seeking" behavior to procure the needed "fixes." This then leads to continually greater neglect of ordinary behaviors in favor of drug experience and drug seeking.

In 1956 a group of WHO experts (Eddy et al.) attempted to replace the term "addiction" with that of "drug dependence." They divided the general concept into "physical dependence" and "psychic dependence" and then specified a set of sub-types corresponding to characteristics, effects and use patterns of several "prototypical" drugs. The categories of drug dependence they produced were:

(1) Morphine type; (2) Barbituate-alcohol type; (3) Cocaine type; (4) Cannabis type (Marijuana); (5) Amphetamine type; (6) Khat type; (7) Hallucinogen (LSD) type.

Whatever the merits of the other categories in the WHO list, the logic of including "khat type" as separate and comparable to the others in the series was very weak. Evidence to back up this judgment will emerge later on in the paper, but here we just note that the effects described are essentially equivalent to those of the "amphetamine type," though of lesser intensity. According to the authors, both amphetamine dependence and qat dependence fall under "psychic dependence," with a lack of "physical dependence." The major difference between the two is said to be the development of a considerable degree of tolerance in the case of amphetamines, and the absence of tolerance in the case of qat.

The concept of "psychic dependence," is less well-defined than is "physical dependence."

> 'Psychic dependence' of a substance generally refers to most of the same qualities as does 'physical dependence,' but to be less powerful in its grip on the user because it does not produce physiological withdrawal symptoms or inevitable tolerance' (Eddy et al. 1965:723).

The same group made the following judgment about qat, apparently on the basis of the travelers' reports:

> . . . the pleasurable effects afforded by khat are a strong inducement for many to procure by any means the necessary supplies at least once a day or to repeat or prolong the periods of chewing, often at the expense of vital needs such as food. Such behavior is a manifestation of psychic dependence (Eddy et al. 1965).

This is an unsupported statement, and according to our experience, it is extremes. First the question should be asked: What are the Yemenis' own conceptions of the degree of dependence produced by the drug? A general cultural concept of dependence on qat does exist. In Yemeni usage, the word *mula'i* refers to one who is "tied to" qat; that is, dependent upon it. Another term, *mut'wala*, used more in the Taiz region, also refers to dependence, but has a less strong implication, more closely approximating our concept of "habitual." The term *mudman*, on the other hand, literally means "addicted," but it is generally reserved for either opium or alcohol dependence, and rarely used in connection with qat.

Despite their use of the above terms, the unanimous report of the many Yemenis we encountered who had gone abroad to study, or for labor migration, was that they were able to cease chewing without any difficulty whatever. They claimed to be able to forget about qat altogether until they returned to Yemen. Mancioli and Parrinello who remained in Yemen over an 11-year period, also noted this apparent ease in doing without:

We should also mention the ease with which habitual users are able to temporarily abstain under specific circumstances (no smoker would be able to do the same with cigarettes). . . . The same case of quitting, at least temporarily, was observed in our private practice as the result of medical prescription (1967:162).

A number of migrants who presently go regularly to Saudi Arabia even said that one reason they emigrate is to *escape* for a time the social pressure to chew qat. Even if they earned the same salary in Yemen, the high prices of the drug and unavoidable pressures to chew do not allow them to save money. These pressures to conform are so strong that many university graduates who return from Europe with a newfound disdain for the qat habits of their parents, nevertheless find themselves chewing again within a few weeks. They feel ostracized and cut off from the society of their fellows if they do not participate.

However, despite much testimony that no physiological withdrawal symptoms occur, the picture on this issue is not very clear. Discussion of this question with some very heavy chewers produced some descriptions of experiences which appear to qualify as true withdrawal symptoms, even if they are of a weak type. Heavy chewers described having attempted to stop chewing qat more than once during their lives, and they gave three main reasons for having begun again.

First, they felt a profound lassitude, a lack of energy and general sluggishness. For several days they found difficulty in initiating their normal activities. They also experienced a slight trembling which could last up to several days. A third experience they reported was the occurrence of extremely unpleasant dreams for several nights after abstaining. For example, they often had rather paranoid dreams of being attacked, strangled, or followed.

Some heavy chewers reported only one or two of these symptoms, while a few said they had experienced all three. All of them voluntarily attributed the onset of these negative experiences to the cessation of qat chewing. Yemenis who are *not* extremely heavy daily users did not report these symptoms – in fact, they denied them – though they were aware that such experience may happen to heavy users.

Thus, though the literature on the clinical effects of qat claims that it produces only "psychic" dependence and no physical dependence, it seems to us that the nightmares and trembling which *very heavy users* report after stopping use cannot be explained away entirely as "rebound phenomena" (cf. Halbach 1972:27). The mildly depressive feelings of lack of energy and powerlessness may indeed be at least partially due to psychological conditioning, but the general malaise, trembling and bad dreams also appear to be at least in some degree purely physiological products of deprivation. We believe present evidence supports the hypothesis that a mild form of physiological dependence does result from *extremely heavy* use, but since the percentage of people using at the

very high level is small, true physiological dependence appears to be relatively unimportant in the overall Yemeni picture.

Tolerance

As with the overall question of dependence, because of the self-limiting nature of the use patterns, there are problems dealing with the concept of tolerance to qat. The amounts normally chewed are relatively standard. At a typical session during an afternoon, most individuals chew one *robda* (bunch) of the long branch-type (generally from 18 to 20 inches), or the equivalent amount of other types. Examples of the largest *robdas* are the 18- to 30-inch bunches from the Wadi Dahr near Sanaa, or from Hadnan on the mountain of Jabel Saber near Taiz. Two or even three small bundles of leaves from some other areas may be chewed in an afternoon to gain an effect equivalent to that from one large *robda* from Wadi Dahr. By "small," we mean bundles from six inches long and four or five inches thick, such as the *sowti* or *hajaji* from the Sanaa market, or the small sacks of loose leaves (*mandil*), sold in Taiz by the female traders of Jabel Saber. In several attempts to estimate more precisely the amount chewed, we found chewers to average about 100 grams of picked leaves during a session. However, some chewed more than 200 grams and some as few as 50 grams.

Despite such variations, the customs of use automatically limit the amount of active ingredients which can be ingested. Ingestion is by absorption of the active ingredients in the juice through the mucous membranes of the mouth as the fresh leaves are chewed, and by swallowing. During the chewing period, a gradually-formed wad or ball of leaves, which is gradually enlarged, is retained in the cheek. Even the distendable cheek of the average Yemeni, unbelievably stretched by continued long use, can only hold a certain amount of chewed leaves, and the normal-sized *robda* or *mandil*, etc., is well-calibrated for the customary three-to-four hour chewing period. When the time of the normal session has elapsed, most chewers are just finishing or have just finished their qat. Some may stay on a bit longer, quickly chewing what they have left – perhaps refreshing their wad with a few fresh leaves donated by a neighbor who has some qat remaining. After lingering another half-hour, or hour, the remaining few guests also expectorate their chewed leaves, and silently depart. Thus, the customary length of the session also places some limits on the amount chewed.

A number of exceptions to the general afternoon-session pattern should be mentioned. Merchants in their tiny stalls, taxi drivers, and stone-cutters chipping huge building blocks with hammers and chisels, often expectorate their first cheekloads after several hours and reload them at least once, so that they can maintain a feeling of energetic well-being. These individuals consider qat a necessary adjunct to their productive activity, but they, too, are limited by the

sheer difficulties of chewing large amounts of leaves. They generally cannot use more than twice as much as the ordinary chewer.

The Latency Effect

Many foreigners who chew qat for the first time claim to feel no psychophysiological effects at all, and concur with Niebuhr, who, in the mid-18th century reported that:

> . . . its insipid taste gives no indication of extraordinary virtues, the only effect we felt from the use of this drug was the hindrance and the interruption of our sleep" (1792, orig. 1794).

This raises another important issue, the question of the degree to which a cumulative buildup of the active ingredients in the body is a part of the qat experience, and of tolerance to the drug. One explanation for the reported lack of initial response to the drug could be a "latency" characteristic, and El-Mahi has proposed that qat has exactly this quality:

> From the historical down to the contemporary (period) khat has been known to have a definite threshhold, i.e., a latent period varying in time from two to six weeks before its action becomes clearly and subjectively manifest in the taker. . . . khat chewing practised for the first time would not produce any effect at the outset; the effects appear after a period of latency during which there is evidently an imperceptible building up of the "reaction" (El-Mahi 1962; 13–14).

At least two questions are involved here. One reason for the often-reported lack of perceived reaction on first chewing could be the proposed latency or cumulative effect, but another might be that a period of learning is necessary in order to identify effects and to respond to them (Weil 1972: 83–85). The evidence suggests that both of these factors are operating.

As Weil has so well described for marihuana, for many drugs some time is required in learning to identify subjectively distinguishable changes, as well as to understand the range of feelings which are possible to experience. It is true that some novice chewers of qat report no effects, but this is by no means universal. Some, as was true in our own case, report a heightening of mood within an hour, while others do not feel any behavior changes, such as increases in sociability and loquaciousness. Subjective unawareness of behavior change seems particularly noticeable in normally talkative and intense individuals. One typically verbose and active professor visiting us in Yemen kept vehemently claiming all through his first chewing session that he was experiencing *no* effects at all. Yet those of us who knew him agreed that his normally mild "manic" traits became much more pronounced during the afternoon. Ordinarily he is much more responsive to feedback, but on this occasion, as one Yemeni intellectual aptly remarked, "It was like talking to a radio." We may add that the volume on the "radio" was turned up.

These considerations do not rule out the possibility that cumulative effects are also probably important. Indeed, we have some evidence which is confirmatory of such a latency hypothesis. Figure 1 is taken from our EKG monitoring of the changes in heart rate of 55 subjects who chewed qat under experimental conditions in our laboratory in Sanaa.

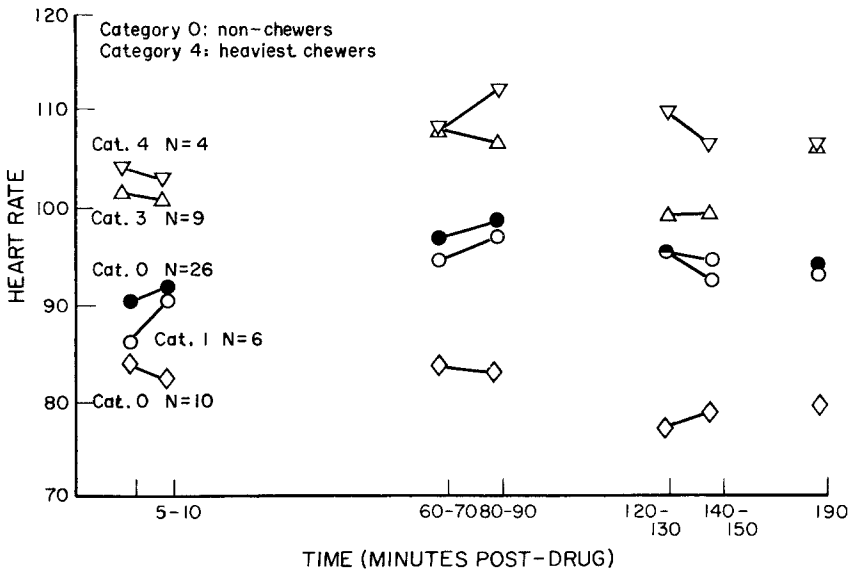

Fig. 1. EKG monitoring of changes in heart rate.

These categories of individuals were classified from 0–4 on a scale of heaviness of chewing. It is most interesting that the pattern at the beginning of the session is exactly what we would expect if a latency effect was being produced. The non-chewers were recorded at about 83 beats per minute at the beginning while the heaviest chewers are over 100 bpm, and the others ranged between these in appropriate order. All the groups held their relative positions through the pattern of rise and decline during the three-hour chewing period. This provides provisional evidence that each group of chewers began the session with a different and category-consistent level of the active ingredients in their systems, which was proportionately augmented by chewing.

From all of this it is clear that the "tolerance" question with regard to qat is more complex than might have been supposed. In many publications it is stated bluntly that no tolerance factor exists for this drug (e.g., Halbach 1972). However, there is scant experimental work and the amount of active ingredients which may be ingested is automatically limited by the customs of use, there is little basis for these opinions. Our discussion and some evidence on

the "latency" question lead towards a hypothesis of what might be called "stabilized" or "controllable" tolerance. That is, each individual appears to attempt to achieve levels of the active ingredients which "feel right" to him and which he may, more or less, achieve or maintain through a self-regulated pattern of intake. It seems that qat chewers make conscious or unconscious choices regarding the optimum levels for the sensation they want to achieve. Customary use patterns, regulated somewhat by natural limitations upon amounts of active ingredients which can be ingested, enable them to gauge the effects upon their systems fairly accurately. Each man finds his own *kayf*, so to speak.

This assessment is also supported by the fact that most people easily classify themselves as to how much and how often they chew. Without hesitation they say that they chew once a week, three times, or seven. They also make decisions based upon a number of factors, such as income as it relates to cost, future plans, allocation of time, etc. The vast majority of chewers seem to easily control their intake according to rational criteria, which again supports the hypothesis that people try, and generally succeed, to hold steady the levels of active ingredients they judge to be optimum.

We may even propose that these levels of active ingredients which accumulate in the body and the accompanying feeling states, may be geared to particular types of qat. It is common opinion in Yemen that qat from each area is distinctive in its effects. In Sanaa, for example, expensive types such as those from "the Wadi" or from Dul'a are held to produce a better *kayf*, and to be much less productive of disagreeable side effects, like sleep loss and loss of sexual potency, etc., than, for example, the cheaper *sowti* or *hajaji* from farther north. In the Taiz region, the *jeddi* and *hadnani* are among those with good reputations, while *sharabi, maqtari* and *jashani* are among those alleged to be "strong" and of poor quality.

There is also a common belief that "the qat is best in its own country," an aphorism indicating that the best effects are achieved with the qat one is used to, and which is taken in familiar surroundings. However, in keeping with our hypothesis of "controllable tolerance," strangers in an area after a very short period of experimention are soon able to find the amount of local qat which suits their individual preference effects.

Availability

A variable which may confound studies of drug use and addiction is that of "availability" or access. Laws against various substances, and variable degrees of success in enforcing them, may make for a large unknown factor, and costs are another aspect of the equation. The situation in Yemen is very interesting

because qat is legal, and it is harvestable over a period of several months. Also staggered planting practices, differences in microclimate, irrigation in some areas and new roads together create a situation in which qat is virtually always available in many parts of the country. Contributing to availability is the fact that in almost any qat market one can find a cheap kind of qat as well as an expensive one. In the larger markets there is a range of prices.

For many Yemenis, therefore, the availability factor is nearly a constant. Qat is readily available most of the time to most people at a price which they regard as within their income capabilities. This is particularly true in the three major cities in which we made our study, even though at lower levels of income the choice to chew regularly may mean a sacrifice of some amenities of life. Access to the drug is not completely uniform, however, and differential availability does sometimes play a role. In some rural areas where qat is grown, especially in Hojeria, there are considerable numbers of people who may chew two or three times in one day. People from the northern part of the country claim that these southerners, particularly the inhabitants of the "qat mountain" of Jabel Saber near Taiz, spend all their time lying around chewing. They say that the Sabris regularly indulge three times daily for several hours at a time.

Our observations in this region did not completely bear out this stereotype of general excess, but they did give it some support, adding evidence that availability is a factor relating to frequency of use. For example, at weddings and other special occasions, people of Jabel Saber, as those in some other qat-growing areas, were observed to chew two or three times. There are also certainly individuals there who chew several times a day throughout the year, but this is much more common during the rainy season when qat is abundant and the price is low. It must be emphasized, however, that such a high level of qat consumption is not a universal pattern anywhere in Yemen. Even where qat is most plentiful the majority of people do not chew anywhere near the maximum which would be possible, and there are always non-chewers and light chewers in addition to the heavy users.

Other evidence that, under certain conditions, availability of the drug does play a significant role, is shown by the fact that in a survey of qat merchants in the three cities of Hodeida, Taiz and Sanaa, approximately 96 percent were heavy chewers, chewing one or more *robdas* daily. It appears, therefore, that if a person has a high exposure to qat, e.g., either growing it or selling it, there is a strong tendency to use it habitually.

We have said that though there are seasonal fluctuations in amount and therefore price, a majority of Yemenis have "access" to a more or less continuous supply of qat. Moreover, there are few attitudinal restraints against using the drug, which is present in the market in large amounts. Nevertheless, the high cost is an important restraining factor. At the time of our study the price averaged

from two to eight rials per *robda* for the inexpensive types, and from 12 to 40, or even 50 rials, per *robda* for the more expensive types. Qat certainly constitutes an important proportion of the budget of most families, as can be seen in Figure 2.

Qat and Values

Reflecting on the questions of availability and cost suggests one way to look at the question of "dependence" upon the drug. There is ample supply in a situation of customary use, but limited resources make it necessary for people to *choose* between qat and other amenities of life. To what extent do Yemenis "trade-off" various "goods" against one another?

A beginning in this direction may be made by viewing "addictive" behavior as another form, an extreme one, perhaps, of choice behavior. The decision to ingest a particular substance may be seen as deriving from a high or low position of such behavior in the value hierarchy. In this conception, ingestion behavior might be counted as "addiction" if it is near the top of the value scale. Our data bring some provisional light to this question by showing how the choice to chew compares with some other important choices in the value hierarchy.

Of course, we do not have a complete study of the Yemeni value system, but some of our data seem applicable. For example, we can propose the general hypothesis that the degree to which individuals are dependent on qat will be shown in a general sense by the degree to which they will make sacrifices to get it, i.e., by the degree to which scarce resources are allocated to qat rather than to other valued commodities. The ratio between the proportion of income spent on qat and that spent on food should, when corrected for income level, be some measure of the degree to which qat use is valued by the Yemenis.

The first observation suggested by these data is the amazingly high percentages of family income generally spent by Yemenis upon this recreational drug. Lower-income heavy chewers spend proportionately more money on it than they do on food; and even the more wealthy/heavy chewers allocate a remarkable percent of their incomes to it. Even for the lighter uses, the sacrifice is considerable. The graph also shows that the higher the level of income, the more likely it will be that the individual will spend more money on qat, but, of course, it will be a lower percent of his income. In other words, the richer individual will be likely to chew more, but can allocate money to other expenses and purposes, while the poor individual will sacrifice other amenities to participate in the qat experience. Certainly these data confirm our general observations that qat occupies a very high place in the "value hierarchy" of Yemenis.

At the time we were in Yemen, the price of a kilo of meat was about equivalent to that of a *robda* (bunch) of fine qat. Since meat is highly desired by the

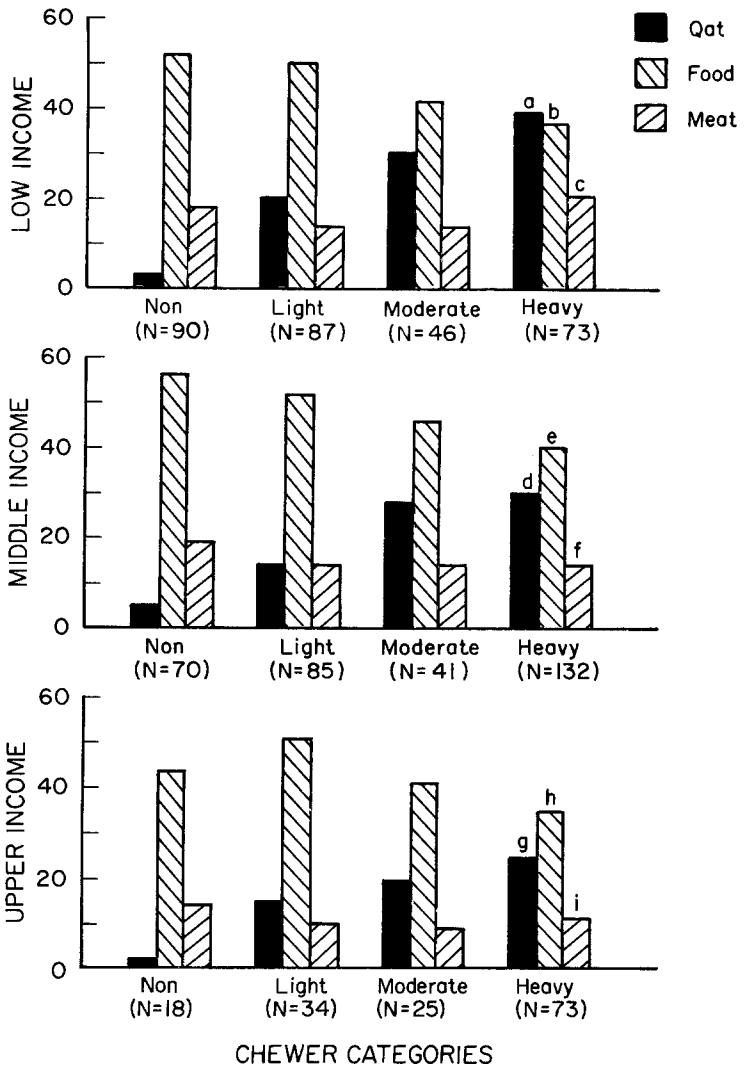

Fig. 2. Qat, food and meat expenditures expressed as percent of total income.*

* This graph collapses data from our samples of men and women from all three cities: Sanaa, Hodeida and Taiz.

[a] males: $F=99.76$, $p < 0.001$; females: $F=19.23$, $p < 0.001$
[b] males: $F=8.19$, $p < 0.001$; females: $F=12.52$, $p < 0.001$
[c] males: $F=9.96$, $p<0.001$; females $F=4.40$, $p < 0.01$
[d] males: $F=87.89$, $p < 0.001$; females: $F=19.51$, $p < 0.001$
[e] males: $F=15.51$, $p < 0.001$; females: $F=5.33$, $p < 0.01$
[f] males: $F=7.28$, $p < 0.001$; females: $F=6.11$, $p < 0.01$
[g] males: $F=27.20$, $p < 0.001$; females: $F=17.87$, $p < 0.01$
[h] males: $F=1.39$, n.s.; females: $F=0.52$, n.s.
[i] males: $F=0.66$, n.s.; females: $F=1.08$, n.s.

Yemenis as a principal daily food, another crude indication of the trade-offs may be deduced by comparing the degree to which people allocate money for meat with the amount spent for qat. As a general trend, Figure 2 shows that the proportion of money spent for meat increases as the percent spent for qat is reduced. As we would expect, this does not hold at the upper income level where the percentages spent for meat are fairly constant. Correspondingly, there is a proportionate drop in expenditures for food as the heaviness of qat use increases, regardless of income, indicating the greater willingness to sacrifice for the drug as the habit grows stronger.

QAT AND DEPENDENCE

We have discussed qat and "dependence" in very general terms. We now want to focus on a different aspect of the problem, and to ask whether there is anything which this case can suggest to us about theories of drug abuse?

Theories of addiction are for the most part predicated on the assumption that people take drugs or engage in other similar "compulsive" behaviors because they feel threatened, anxious, in pain and/or inadequate in some sense. The ingested substances permit them to temporarily forget these feelings, by providing them with an "escape from reality." The escape experience then tends to become so highly rewarding as to be "craved" and repeated (e.g., Kielholz 1973: 8–9).

It has struck us as curious that while authorities and investigators have chorused the notion that "drug addicts" are motivated primarily to escape their problems through blotting out the pain of "reality," the "heads" themselves often speak of "kicks" and emphasize the pleasurable side of drug taking. When reduced to their essence, most explanatory attempts turn out to be some variation of simple pleasure/pain theory. It may seem obvious that both pain and pleasure are involved, and in varying proportions, and that different drugs clearly vary in their actions of either deadening pain or enhancing pleasure. However, the explanations seldom attempt to sort out and assess these differing effects.

The assumption that the major motivation for drug use and abuse is escape from the realities of a harsh environment or from facing the consequences of an inadequate self-image arise with monotonous regularity in literature, and most authors writing about qat in Yemen also fall back on some form of this argument. The impression one often receives from the literature is that Yemen is a country of qat (drug) addicts, and that the explanation for this behavior is the existence of universally miserable conditions in the country. For example, although Mancioli and Parrinello are not dogmatic at all, they do employ the same stereotypical ideas:

Undoubtedly the desire for qat is conditioned by environmental factors: the monotony, the harshness of life, the general low cultural level which inhibits various interest, etc., are elements which are present in Yemen and foster the spread of the use of qat (1967:161).

It is difficult to realize how the desire for qat originates, particularly with the lack of a true enslavement to the leaves. Very simply, it may be said that, in an evaluation of the 'typology of desire,' the yearning for euphoria and physical vigor have a prominent place (ibid).

Stanton Peele has recently sharpened and elaborated this commonly held general set of causal assumptions by describing what he calls the "analgesic effect":

The definitive characteristic of every sort of addiction is that an addict takes something that relieves pain of whatever kind. This 'analgesic experience' goes far towards explaining the realities of addiction to a number of very different substances (1978:61).

Addiction is an extension of ordinary behavior – a psychological habit, dependence or compulsion. Just how pathological or addictive that behavior is depends in part on a person's life. When an involvement eliminates choices in all areas of life, the addiction has been formed (1978:67).

The analgesic theory clearly stresses pain avoidance, and though relief from distress may be said to be in some sense pleasant, this emphasis makes the pleasurable side of the drug experience secondary and removes it from a causal status.

This concept does, of course, account for much drug dependence that we see. It obviously works fairly well in the context of the American ghetto scene with substances such as morphine, heroin and other opiates, even though with these there is a certainly a strong pleasure component. However, the analgesic theory seems much too rigid for a general theory of all drug habituation. It does not take account of individuals like legendary oriental potentates and many others whose pain and malaise are not demonstrated. These may take opium for pleasure, etc. But the weakness of such attempts to stretch such a narrow theory to cover *all* forms of habitual substance use can more clearly be seen in Peele's (1978) attempt to apply it to stimulants. Referring to recent research by Paul Nesbit, he says:

How can we analyze addiction to cigarettes and other stimulants in terms of experience when that experience is not analgesic? The answer is that cigarettes free smokers from feelings of stress and discomfort just as heroin does, in a different way, for heroin addicts.

The person who becomes addicted to cigarettes (and other stimulants) apparently finds the rise in his heart beat, blood pressure, cardiac output and blood sugar level reassuring. This may be because the smoker becomes attuned to his internal arousal and is able to ignore the outside stimuli that normally make him tense.

Coffee addiction has a similar cycle. For the habitual coffee drinker, caffeine serves as a periodic energizer throughout the day. As the drug wears off, the person has not changed

his inherent capacity to deal with the demands of his day demands of him, the only way for him to regain his edge is to drink more coffee. In a culture where drugs are not only legal but generally accepted, a person who values activity can become addicted to nicotine or caffeine and use them without fear of interruption (ibid:66).

Peele's argument is attractive in some ways, but it does not probe deeply enough. The blanket use of the analgesic model appears to inhibit a more penetrating inquiry. It fails to distinguish the stresses coming from the environment from those stemming from the poor self-image of the individual in dealing with the environment, or from the "conditioned" response of lack of energy, etc., i.e., the rebound phenomena, which accompany cessation of a stimulant. Even more important, it assumes without proof that the negative desires to avoid rebound effects are more important than any desires to achieve positive feelings. Let us now see if any of our data on qat apply to these questions.

How far does this "analgesic hypothesis" actually take us in accounting for widespread qat use in Yemen? Some of our data may bear on this general problem, since in our interview schedule we asked a number of questions which relate to motivations for chewing. These had been previously derived from participant observation in many qat sessions where we had probed people's attitudes. For example, the interview contained the general question: "Are there any situations, apart from normal social ones, when it is beneficial to chew qat?" Among a number of items they listed were five which referred specifically to pain relief in a broad sense (colds, fevers, headaches, body aches and sadness [depression]). The answers to this question enable us to propose that, if chewers tend to use qat to relieve pain, this will be reflected in the heaviness of their chewing. The hypothesis may be stated more specifically as: *Heavy chewers will tend to report more pain-relieving benefits than will light chewers.*

Before examining the final breakdown by heaviness of chewing, it seems significant to note that 72% of the chewers in our sample see qat as providing some kind of relief from pain. On the other hand, it seems quite remarkable that in a country where qat is so available, where there are widespread beliefs about it as an antidote to sickness, and where everyone has considerable experience with it, as many as 28% of the chewers see *no* pain relieving benefits at all. This is even more remarkable when we break down the group reporting "no benefits" and find that 30% of them are heavy users and 17% of them are moderate users. That is, nearly half of them are those whom we would expect to be believers in its efficacy. Now let us look at a finer breakdown:

Figure 3 shows that more heavy chewers are among those reporting more pain-relieving benefits, and that significantly more of those reporting "no benefits" are among the light chewers. Thus, these data do provide some provisional support for the hypothesis. However, it could be argued that Figure 3 really shows only that the heavier the use, the more one is likely to *believe* there is

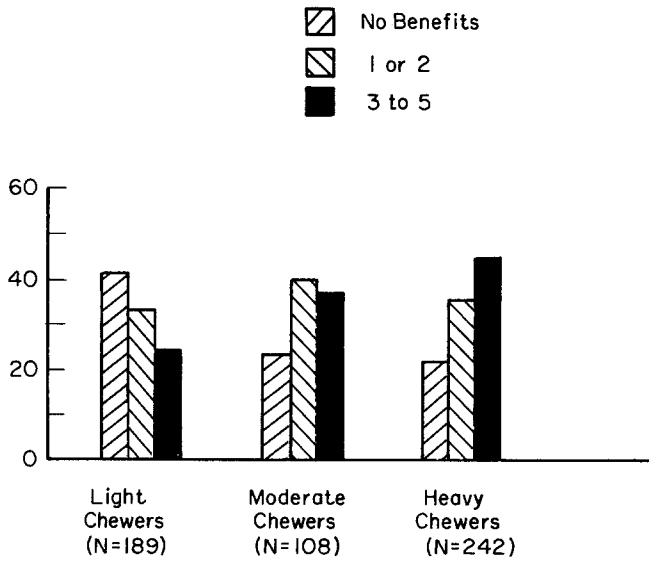

Fig. 3. Number of pain-relieving benefits by chewer category.*

* males: $F=2.58$, $p < 0.05$; females: $F=23.35$, $p < 0.009$.

some pain relief in it, and perhaps belief rather than the drug is what is convincing people that pain relief is associated with use. It could be, too, that these trends simply reflect a tendency to rationalize use. Perhaps the more one chews, the more he tries to justify the high expenditure of time and money involved.

We cannot resolve such questions here, but we can look at the analgesic question from other perspectives. One of these is to conjecture that poorer people are likely to suffer more general distress and exposure to sickness than would wealthier people. If indeed qat is a drug which facilitates alleviation of pain and distress, or is perceived to do so, poor people would be more likely to use it for that purpose than would wealthier people. The reasoning is that the poor are more likely to chew for the *alleviation of distress* than are the rich, who may also sometimes chew for that reason but who will not be subject to *as much* distress, and would therefore be more likely to cite other reasons. We can frame this hypothesis as follows: *Poor chewers will tend to report more pain-relieving benefits than wealthier chewers.* When our data are applied to this hypothesis, the following figure results:

Figure 4 shows that, contrary to the hypothesis, the wealthier a chewer is, the more he or she is likely to report pain-relieving benefits. This data seems to indicate that the Yemenis do not tend to chew for the purpose of alleviating the generally stressful conditions of poverty, but, again, we must proceed with caution. There is at least a possibility that wealtheir people's experience with the

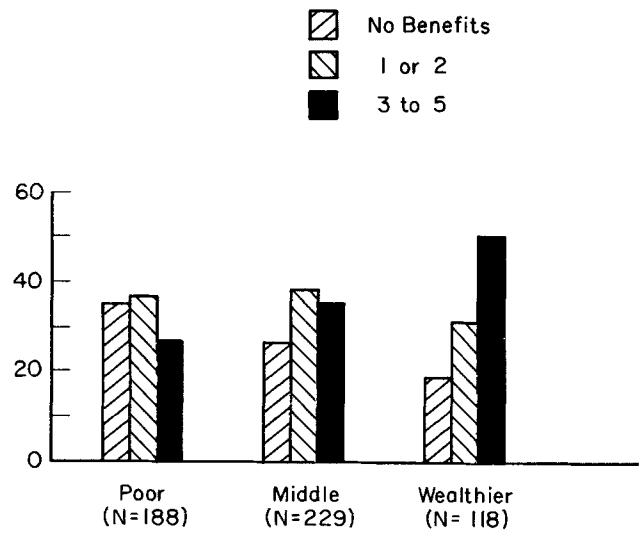

Fig. 4. Number of pain-relieving benefits by economic category.*

* males: $F=26.05$, $p < 0.001$; females: $F=0.035$, n.s.

drug is more meaningful, since they can afford enough of the drug to provide the analgesic effect. We would tend to discount this, however, on the basis of our experience that amounts of qat ingested do not vary much between rich and poor. The reasons that richer people tend to report more pain relieving benefits, thus remains open at this time.

A third method of partially testing the analgesic hypothesis with our data is to examine the proposition: *Chewers who are more ill will tend to report more pain-relieving benefits than chewers who are less ill.* This is based on the assumption that ill people will be likely to experience more distress than well people and will, therefore, tend to be found more in the ranks of the heavier chewers. We have classified our sample into (1) Those who are well or only suffering from trivial complaints, (2) Moderately ill people who can still function fairly well, and (3) Severely ill people. When we look at these classes in terms of the frequency of pain-relieving benefits reported, we see the situation depicted in Figure 5.

Again, the results are contrary to the expectations derived from an analgesic explanation. There are few differences between the illness categories, but those that do exist are in the opposite direction. That is, well people actually tend to report more pain-relieving benefits than do sicker people. In fact, 87% of those classified as "well" report at least some pain-relieving benefits, while only 65% of the "severely ill" report them. Again, further analyses may reveal some other reasons for this distribution, but at present, we can simply say that the figures do not support an analgesic hypothesis.

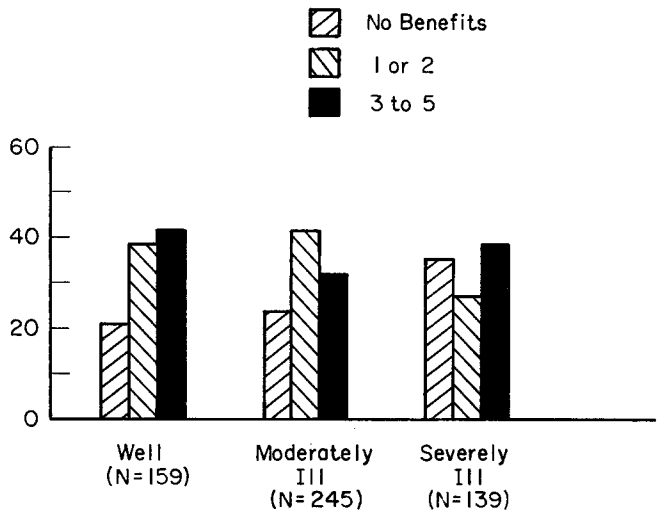

Fig. 5. Number of pain-relieving benefits by severity of illness.*

* males: F=2.58; n.s.; females: F=2.10, n.s.

In a final effort to approach the question of analgesic motivation for chewing qat, the physician member of our team (Teague) classified all of the illnesses diagnosed by the doctors in our study as to their pain-producing potential. Each was classified on a scale of 1 = no pain potential; 2 = some pain potential; 3 = high pain potential. Figure 6 shows how this scale relates to chewers' perceptions of pain relief.

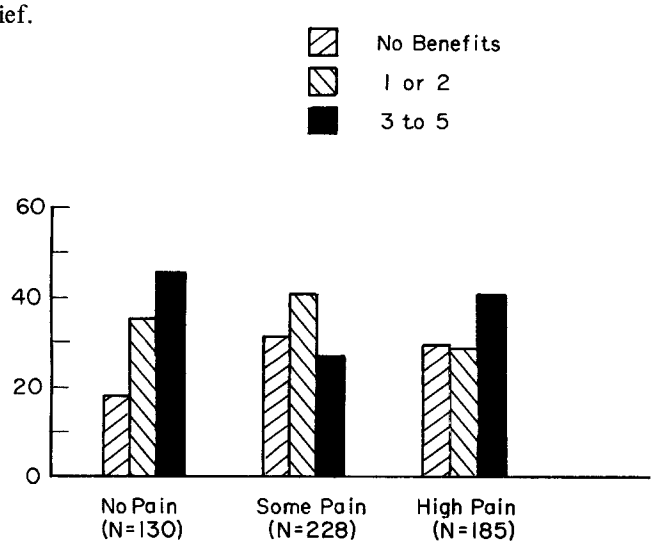

Fig. 6. Number of pain-relieving benefits by pain potential.*

* males: F=0.68, n.s.; females: F=0.77, n.s.

The results of this breakdown are much like those which emerged with the general overall illness categories. The distributions are again mixed, but again the contrary result emerges that the lower the pain potential, the more likelihood there is of perceiving pain-relieving benefits from qat chewing. These data along with those in Figures 4 and 5, seem to provide more conclusive evidence against the analgesic hypothesis. While we do not lay any claim to certainty, we conclude that the motivation of attempting to escape harsh reality, although it may be important in particular cases, is probably not a major reason for the massive chewing of qat in North Yemen.

Of course, we are aware that the motivations for drug dependence are undoubtedly always complex. This is, indeed, one of the reasons we have challenged the oversimplified "analgesic hypothesis." Let us now, therefore, turn to the question of positive motivation or reward characteristics of qat. Though again admitting that we cannot answer the questions with any finality, we can apply some of our data to the problem, with the hope of moving a step forward.

In addition to our early informal interview questions about the possible relief from pain which the drug might afford, we also asked about the feelings of the *kayf*, or state of pleasure, which chewers experience. The feelings upon which considerable consensus had emerged were increases in the flow of ideas, alertness, ability to concentrate, contentment, confidence, and friendliness. In our more formal interview, as in the case of pain-relieving benefits, respondents were asked to choose as many of these six as they thought applicable to their own *kayf* experience. Thus, again the numbers of such experiences listed by chewers should be some measure of the pleasurable effects of qat chewing.

Following reasoning similar to that used with the problem of pain relief, we began by proposing the hypothesis that: *Heavy chewers will tend to report more pleasurable experience effects than will light chewers.*

We should first note that 14% of the chewers reported no *kayf* effects at all, while 86% reported at least one such effect. It may not be significant that the percentage of "no effect" is half that of those reporting no pain-relieving benefits (28%), but it is worth noting.

In Figure 7 again we seem to find a definite trend: heavier chewers tend to report more positive effects than do light chewers. In general, Figure 7 seems to indicate that greater pleasure is associated with heavier chewing. The question of why 10% of the heavy chewers and 10% of the moderate chewers report no *kayf* effects at all must await further analysis of the data, but these percentages remain insignificant in the overall picture.

The foregoing data and discussion have neither convincingly disproved the analgesic hypothesis nor strongly supported an alternative "pleasure-seeking" hypothesis. It must be admitted that there is considerable usefulness in the analgesic hypothesis, but in order to push our understanding of drug use farther,

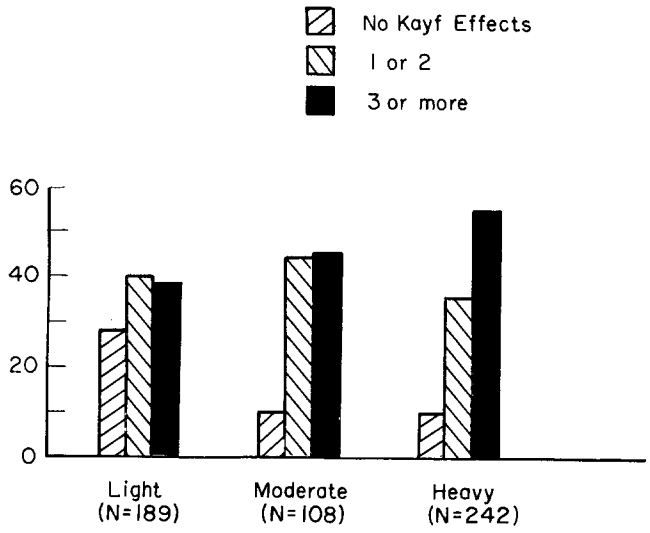

Fig. 7. Number of positive kayf effects by chewer category.*

* males: F=0.41, n.s.; females: F=20.77, $p < 0.001$.

it would seem necessary to distinguish carefully between drugs, and to introduce other ideas. It seems clear that we must not only consider the question of drug effects on alleviation of pain and the production of pleasure and their interrelationships, but we must also look more carefully at the particular *kinds* of pleasure and the *kinds* of pain of discomfort involved.

For example, we spoke of the necessity of distinguishing between "conditioned" drug-related discomfort responses, and the discomforts and pains which impinge more directly from the environment. It seems necessary that we should also break down the *kinds* of dependence or addiction according to the *kinds* of rewards involved. To move in this direction we may distinguish at least the following motivations as potentially related to the "choice of drug."

First there are those drugs which specifically relieve corporeal pain or discomfort without affecting consciousness directly; aspirin, codeine, etc., come to mind here. Second, are those drugs which may not only deaden pain, but have a consciousness-altering capability. Some of these have a pain-reducing capacity as well, but with them the motivations of the user are generally to either "escape from reality" and/or to enter "another reality." This experience has promise of being very pleasurable and may be sought for its pleasure alone, or since its consciousness alteration also removes the perception of pain, discomfort and/or failure, it may also be sought, at least in part, for its general "analgesic" properties. Of course, the motivations are often a complex combination of these, giving these drugs tremendous appeal. Not only are pain and the feeling of inadequacy

in the face of an intractable environment made to disappear, but a world of drowsy womblike numbness, or one of interesting fantasy images and activities is made available. Pain-relieving and pleasure-producing characteristics are combined in a powerful dose of positive reinforcement. In this proposed class we would place morphine, heroin and the psychodelics, etc.

A third type of drug does nothing directly to block pain, nor does it, in itself, produce any alterations of consciousness, escapes from "reality," or journeys to the hidden layers of personality. Instead, the main effects of such drugs are to elevate mood, and to speed up cognitive processes. Rather than facilitating an escape from consciousness and from "ordinary reality," they facilitate awareness of, and *connectedness with* that reality. They can induce a sustained focus of attention and high concentration, along with increased sense of capability and control of the environment. These substances heighten both mood and cognitive process to produce an outward, active orientation to external reality. They facilitate extraversion, sociability and communication, rather than introversion, passivity and contemplation.

In other words, their relationships to pleasure and pain are of a different order than is the case with the other two classes of drugs I have outlined. A period of cessation of the *awareness* of pain, discomfort and inadequacy is certainly facilitated, but it is accomplished not by the numbing of or alteration of consciousness, but by a focus upon the "real" ideas and activities valued by the culture. Sometimes they do indeed transfer attention away from present "real" problems, but more often they stimulate intensive efforts to solve these. Such effects are facilitated by feelings of enhanced self-worth and a sense of ability to master the situation. A sense of mastery and control is certainly rewarding, but it is a different *kind* of reward from the childlike pleasure or nirvana produced by the direct stimulation of pleasure and fantasy centers. It is a reward directly relevant to socially-valued goals, rather than to narcissistic indulgence.

In the case of institutionalized stimulant drugs like qat, the basic theory of pain and pleasure surely must be utilized, but kinds of pleasure must be distinguished as well as kinds of pain. We must devise ways of assessing the relative weight of these and even think of reversing their usual explanatory order in some cases. Chewing qat is a pleasurable experience and contributes to one kind of "pleasurable reality," and anything which gives intense pleasure temporarily assists the user to transcend his surroundings. For example, the nearly total absorption possible in active sports, rituals, etc., have the accompanying, rewarding "side effects," of reducing levels of anxiety. They assist in the forgetting of pain by allowing escape from mundane reality for the moment.

What we propose is really only a case for a more complex theory. In the case of stimulants, we need to shift from a simple negative focus upon the reduction of pain, which might be appropriate with other drugs, to one in which

the pleasures of reality mastery are given precedence in the complex equation.

As is probably evident by now, our experience with qat is what led to our thinking on these matters. It seems evident that Yemen has evolved a cultural institution around the qualities of the third type of drug outlined, and we now want to conclude the discussion with some further reflections on the problem of "massive addiction" and institutionalized drug use or dependence. It seems evident to us that this cannot be explained by reference only to the drug effects themselves. A more comprehensive view must be added.

In Yemen, a social institution has been created which provides rewards over and beyond those which may be associated with drug use *per se*. At the qat session, people are entertained and may express themselves in a relatively uninhibited and spontaneous manner. It is a place, unlike any other in the society, where as at no other time each person has license to be himself. He who is ordinarily ignored can command attention, and anyone may argue without being held fully to account. At the same time, it is a place where there is an expectation that mundane concerns may be transcended. The senses are heightened, attention is fully aroused and focused: the essence of this experience is the feeling of mastery, of being fully alive, fully social, and therefore "meaningful" in an existential sense. The qat session is an institution which temporarily produces that "sociability" in Simmel's connotation, or "communitas" in Victor Turner's terms, which is so valued by human beings everywhere. Thus, it is not simply the drug effects to which people are "addicted," though these are clearly the predictable physiological symbol of the sought for, valued state. Rather they are "addicted" to the *qat session* as a sustained set of pleasurable experiences, a many-faceted reward system, which became associated with its most tangible feature, the qat leaves.

Of course, the actual situation is not quite so simple as this. Group interaction *in itself* can surely produce euphoric feelings and the temporarily enhanced feelings of self-worth. Qat can also generate some of these effects in isolation. What we are arguing is that when these two are conjoined, a synergistic effect is produced which is more powerful and rewarding than either in isolation. As has been pointed out for many other drugs, both setting and psychological set are important to the overall experience (Weil 1972 29–30), but these set-and-setting effects vary in their role with different drugs. With psychodelics a supportive environment may help to induce a "good trip," but with a stimulant drug like qat, environmental features of sociability act powerfully to reinforce the mood-elevating and cognition-enhancing effects.

Concepts of social reward and its synergistic power help us to understand the widespread, regular use of qat, but they still do not seem sufficient. There seems to be more to it than just millions of individuals, each of whom is satisfying his own needs for stimulation.

In Yemeni culture it is universally accepted that it is "proper" to go to qat sessions. The social pressure is to go rather than not to go, and one is seen as somewhat deprived, though he is not ostracized, if he does not participate at some level. Many people go to qat sessions because they *should* go. We have talked to numerous people who do not particularly like qat and rarely achieve a *kayf*. They think qat is far too expensive for their budgets, yet they feel constrained to chew at least once or twice a week. If a person does not chew he or she is going to miss out on most of the interesting behavior and communication which the society has to offer, and will be seen as someone who is "out of it." Only strong personalities can stand against the norm. In one sense it is necessary to be where the social action is.

The point should not be belabored, but it bears emphasis as a part of the overall attempt to account for why the majority of Yemenis use the drug qat to the extent they do. Some concept of "cultural drug dependence" needs to be added to the equation containing physiological and psychological effects. Qat may well originally have become institutionalized largely on the basis of the qualities of drug effects and interaction rewards we have outlined earlier, but once institutionalized, the social norms themselves begin to operate importantly as part of the motivational configuration. The behavior patterns relating to use come to possess the qualities of "exteriority" and "constraint" in Durkheim's terms – they are invested with the character of true social norms. It seems necessary to add the social and cultural components to the psychopharmacological theories of drug dependence to achieve any adequate understanding of the widespread or institutionalized use of qat, and this is probably true of several other drugs as well.

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NOTES

1. Here I do not intend to review this early work. It has been discussed thoroughly by Halbach (1972) and Getahun and Krikorian (1973), among others.
2. Alles et al. (1961); Krikorian and Getahun (1973).
3. Support for this research was provided primarily through DHEW Grant 5 R01 DA 00974–03. Two years of field research on qat were carried out between 1974 and 1976. Special recognition must go to the late Dr. Elleanor Carroll and Dr. Louise Richards of the National Institute of Drug Abuse, who backed our research from its inception with great understanding. Other financial assistance came from the Behavioral Science Research Group at the Neuropsychiatric Institute of U.C.L.A. Special thanks for computer and statistical assistance go to Liz Cooney and Bill Rokaw of N.P.I.

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4. The chewer categories were constructed from answers to a series of questions pertaining to chewing in the interview schedule. They probed: (1) The number of chewing days per week, (2) The number of times chewed per day, (3) The number of hours per chewing session, (4) The number of *robdas* per chewing session, and (5) The amounts paid for qat per session and per day. Another set of questions attempted to get at the length of time the respondent had used qat. All of these questions were asked for every season during the past year, as well as for the prior month. Chewers, therefore, had little or no idea how they were eventually categorized.

   The economic categories were constructed from answers to a series of questions pertaining to income, occupation, ownership of property and vehicles, amount spent for various items, etc. They cannot be taken as absolutely accurate, but we believe that the categorizations are consistent relative to one another and are a good approximation of reality. The economic categories do not represent the entire spectrum of Yemeni society because we were not able to secure the cooperation of the very richest people in the society or the very poorest.

   The broad health categories were constructed from the medical protocols filled out by the 11 physicians who did our physical examinations in the three cities of Hodeida, Taiz and Sanaa. The examinations consisted of a brief medical history, examination of all major organ systems, and the laboratory tests. The examining physicians remained unaware of the chewing habits or other characteristics of the respondents they were examining.
5. See Gerholm (1977), Nyrop et al. (1977); Stookey (1978) and Wenner (1966), for useful general treatments of Yemeni history, politics and culture.
6. The most frequent transliteration found in the literature is *khat*. Others are *kat, ghat, qhat,* and *gat*. The *q* spelling is preferred here because it is an accepted transliteration of the *qaf*, the appropriate Arabic letter. The *kh* spelling is simply incorrect.
7. For purposes of this discussion, I will briefly describe the male sessions here, noting only that there are some differences from the female *tofrita*.
8. A *jambiyya* is a curved dagger commonly worn as a symbol of manhood by Yemeni men.
9. Only a slightly higher percentage of moderate and heavy male users reported "3 or more" positive *kayf* effects than did light chewers.

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