

The Descriptive Features of Food Addiction

Addictive Eating and Drinking¹

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A PERSON'S adaptation to a food, even though it is consumed frequently and regularly for many years, usually proceeds in an orderly, innocuous, taken-for-granted fashion so that neither intermittent nor cumulative ingestion is associated with reactive symptoms. Such a person is said not to be sensitive to the particular food.

But not uncommonly people fail to adapt to some foods in this apparently "normal" sense; instead a specific sensitization develops. The symptomatology associated with the ingestion of such foods has come to be recognized as sensitization disease. Food sensitivity, then, may be said to deal with the encroachment of specific foods on the health and behavior of particular individuals.

Once a specific food sensitivity has developed, it may remain at a constant level for fairly long periods or it may pass through any one of several stages. Intake of the foodstuff in question appears to be a major determinant of the subsequent course of events. The two most important aspects of intake having a bearing on this process are (1) frequency of use, and (2) size of the dose.

Importance of Variations in Frequency of Dosage

Frequency and size of dosage both are of prime importance in determining the timing of onset of symptoms following ingestion of an offending food as well as the severity of the resulting response. But in order to observe the effects of one of these closely related factors, it is necessary to control the other. Consequently, in discussing the clinical effects resulting from frequency of dosage, only relatively uniformly absorbed physical forms of a food will be considered. This precaution controls the question of the size of the dose reasonably well, for quantitative aspects of dosage in food sensitivity

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are principally concerned with the rate of absorption from the alimentary canal.

Only relatively unrefined foods will be considered initially, consisting of native mixtures of carbohydrate, protein and fat. Whether they are cooked or uncooked makes only a slight difference. Finally, an attempt will be made to present dosage only in terms of chemically uncontaminated primary foods, inasmuch as the chemical contaminants of certain foods may result in reactions readily confused with true food sensitivity.

In terms of these rather exacting limitations, an individual's adaptation to a given food is relatively constant when it is ingested on different occasions during any week or month, provided frequency of intake of the same food has been constant for an immediately previous period and the individual's status in respect to other specific and general excitants to which he is adapting remains unchanged.

Food Sensitization Resulting From Intermittent Dosage

In keeping with the usual ideas of food sensitization, a patient is apt to have an immediate sharp reaction after eating a food to which he is highly sensitive—if it is taken only occasionally. Such a *let down* immediately after eating is usually a convincing experience and one that will be remembered in association with some unusual food in the previous meal. Cause and effect relationships of this type become firmly established when such a sequence of events has occurred on several different occasions or when an identical reaction has been traced in retrospect to the accidental ingestion of this item.

Food sensitization of this type does not ordinarily bring a patient to his physician. Such a victim usually knows why he became sick. Sometimes he may require medical assistance in recovering from such an illness, for these immediate reactions may be incapacitatingly severe.

Specific intolerance to foods, with immediate acute reactions following the occasional ingestion of shrimp, buckwheat, cashew or other foods taken only rarely or intermittently, has been known since the days of early Greek medicine. Everyone knows about these reactions, although they may be referred to by various names. Nevertheless, this is *food sensitization as it is ordinarily considered*.

Food Addiction—The Reversal of Immediate Effects

In contrast to the ordinary concept of food allergy described above, the chronic cumulative use of a specific food to which one is highly

sensitive is likely to be associated with an entirely different pattern of *timed symptoms in relation to meals*. Paradoxically in respect to ordinary notions of food sensitization, immediate after-meal effects tend to diminish and then disappear when successive quantities of a food are taken while one is still reacting to recently eaten doses.

The cumulative use of such a food is either not followed by a reaction or the subject reports that he feels better after than before eating it.

This *pick-up* or actual improvement in symptoms following the oft-repeated ingestion of a particular food, as contrasted to an immediate postmeal reaction when it is consumed occasionally, is one of the characteristic features of *food addiction*. This adaptation to frequency of ingestion occurring in food sensitization appears to be descriptively identical to the *reversal of immediate effects* occurring in the course of the development of an addictive response to drugs (1-4).

In contrast to the narcotic addict who knows when he is "hooked," the food addict usually does not know of any food acting in this manner. He is only aware that eating in general is pleasant, relaxing, and seems to agree particularly well with him. Because this process usually involves the commonly eaten foods such as corn, wheat, coffee, milk, eggs, and others, the person addicted to one of these is likely to include some form of it in each feeding. The general awareness that some food mixtures are more agreeable than others is ordinarily expressed as a fondness for these combinations, with the resulting tendency to limit food intake to such agreeable types of meals. It should be emphasized that a person usually becomes "hooked" on a food in this manner without any knowledge of what is happening. This is why patients rarely know that they are sensitive to common foods of the diet.

This distinction between ordinary food sensitization (characterized by immediate postmeal reactions) and food addiction (characterized by an absence of immediate postmeal reactions) was applied to at least some extent by Schloss (5), Rowe (6-9), Coca (10), and certain other early workers in the field who pointed out the existence of sensitization to the common foods of the diet. It remained for Rinkel (11, 12), however, to describe unmasked and masked food sensitization as developmental phases of a single process. Although the present exposition is based on Rinkel's concept of masked food sensitization as described in conjunction with him and Zeller (13), I have more recently preferred to call this clinical adaptation

phenomenon food addiction (14, 15). This designation not only appears to be a better descriptive fit but tends to align this common clinical picture with other types of self-gratifying behavior associated with the increasingly frequent use—by ingestion, inhalation, injection or contact—of specific drugs, alcoholic beverages and other materials known to be associated with addictive responses. Irrespective of terminology—whether this be called masked food sensitization or food addiction—this is *food sensitivity as it most commonly exists*.

Food Addiction—The Reversal of Delayed Effects

There is also a reversal of delayed effects as ordinary food sensitization changes to food addiction. Although adequately described (11, 12, 13, 16), this phenomenon has received even less attention than the reversal of immediate effects.

Whereas acute reactions immediately following the occasional ingestion of specific foods tend to subside quickly and are not usually associated with delayed effects, the clinical picture of food addiction is dominated by the inevitable recurrence of delayed symptoms. In progressive food addiction these delayed *withdrawal effects* or hangovers persist for increasingly greater portions of a day, being dispelled only temporarily and sometimes only partially immediately following ingestion of the evocative food. Thus, the course of events in food addiction associated with the oft-repeated ingestion of a specific foodstuff acting in this manner consists of an initial relative respite in symptoms followed by a delayed recurrence. Indeed, one phase of this timed response cannot be considered without reference to the other, inasmuch as the degree of the immediate postmeal symptomatic improvement is actually determined by the relative depth of the delayed hangover existing prior to that feeding.

The most definite statement that may be made about the hangover is the well-known but trite comment that it may be terminated by recourse to more of the thing that caused it. This famous "hair of the same dog" treatment principle—though well known to drug addicts and addictive drinkers—is less well appreciated by food addicts. Nevertheless many of them are practicing it even though the practice may not be recognized for what it actually is.

The majority of patients addicted to slowly absorbed physical forms of a food simply go from day to day eating three or more regular meals with absolutely no realization of what is occurring, for, by chance, their addictants are never avoided. Even in advanced

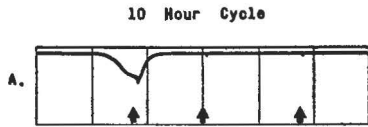
cases, where eating has become the individual's favorite pastime, he may or may not be aware of any single food that he is taking frequently for hangover treatment. The development of this specific process is so subtle that it is often extremely difficult for a person to suspect that he has become addicted to a food even though he knew that formerly it made him sick when he ate it only occasionally. After taking it for a time in oft-repeated doses, he gains the impression that he is developing a tolerance for it or is finally outgrowing the old sensitization.

Finding many patients unreceptive to the suggestion that they might be in trouble from their favorite foodstuffs, I changed my approach several years ago and began talking with new patients having this illness in the "lingo" of addiction. Designating this subject *food addiction* and presenting its development in terms of *adaptation* to one's environment, rather than as food allergy, has greatly facilitated its acceptance. This approach not only seems to sound more reasonable to a patient but has materially lessened objections to the acceptance of specific dietary instructions and has improved compliance therewith.

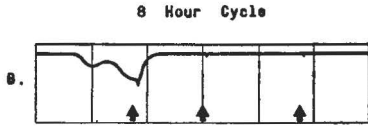
Patients' Reports and Actual Observations

What has been said above in reference to immediate and delayed effects in food addiction is generally true as far as the average patient is able to determine from his own experiences. But when one observes uncontrolled food addicts over a 24-hour period they are apt to exhibit a slight, immediate and transient postprandial worsening of symptoms lasting approximately 15 minutes prior to the onset of their pick-up (13). This slight peak in symptoms just before the onset of relative improvement is illustrated in the upper sections of Figure 1. Further, if a victim of food addiction has troublesome symptoms in the mornings or just before dinner, he also has some chronic symptomatology throughout the remainder of the day. The relative improvement postprandially is so striking to these patients that they do not usually observe that they have some distress at all times. Actually, many of them have lost to various degrees their point of reference as to what constituted a symptom-free existence. A true absence of symptoms—which might also be defined as an "obliviousness or unawareness of one's body" during waking hours—may only become apparent to a patient *after* the application of specific diagnostic measures. What the new long-inured patient may com-

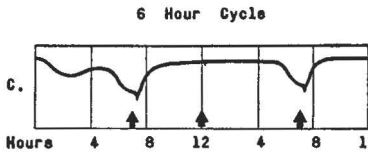
When the addicting food is eaten on a 10 hour cycle in each daily meal (3), daily hangovers recurring at 5:00 A. M. subside shortly after each breakfast.



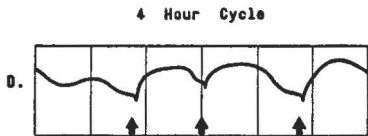
On an 8 hour cycle, withdrawal effects or hangovers recur monotonously at 3:00 each morning, usually waking the victim.



With a 6 hour cycle, symptoms commence at 1:00 A. M. and recur before dinner. Note increasingly chronic symptomatology.



With a 4 hour cycle, there is an increasing level of symptoms, accentuated in the mornings and before each meal. But sooner or later - victims of progressive food addiction learn to postpone the onset of their hangovers and to treat those that have developed by eating frequently and riding the lifts. Addictive eating may lead to obesity.



As alcoholic beverages carry the active principles of their native food sources, their rapid absorption perpetuates this mechanism at an accelerated rate. This may lead the daily drinker of alcoholic beverages into addictive drinking.

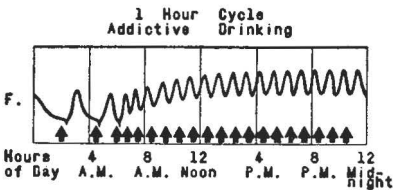
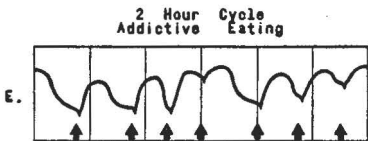


FIGURE 1.—*Addictive Eating and Drinking*. Modified from Rinkel, Randolph and Zeller (13). Symptoms in Respect to the Hours of the Day when a Food Acting in the Addictive Sense is Consumed in Each of the Three Meals per Day.

plain of is likely to be quite different from what he regards as a symptom after a period of adequate management.

These observed variations in symptoms of food addiction are of considerable importance in explaining what is believed to be the mechanism involved in the process, namely the endocrine response

of the specific adaptation syndrome, which will be explained in more detail in a subsequent presentation (17).

Daily Symptom Patterns in Progressive Food Addiction

There are wide variations in the time of onset, severity and duration of the food addiction hangover following the ingestion of the naturally occurring edible form of a food. The hangover varies widely among patients but is remarkably constant for a given person at a given period.

Although hangover or withdrawal effects may last longer, they most commonly persist between 2 and 4 days following the last ingestion of a food acting in an addictive sense. They usually may be dissipated any time up to 72 hours simply by eating more of the causative food. The apparently successive stages in the development of addictive adaptation to a food will be described here.

A hangover may sometimes start between 20 and 24 hours after a given dose of a food addictant—a rather common schedule when the food in question is one taken consistently in the same meal only once daily. However, food addiction occurs much more often to foods consumed in each meal.

Hangover effects may be present only upon arising in the morning and prior to breakfast, provided the specific excitant is taken in each of the three daily meals and the postprandial relative relief of symptoms is approximately 10 hours in duration. This accounts for the monotonous daily recurrences of morning symptoms, as illustrated in Section A of Figure 1. It should be noted that the time of the onset of the morning let-down or hangover (5 A.M.) is pegged to the time of the evening meal (7 P.M.), there being no other period of the day when 10 or more hours elapse between meals. The hours of the day in this and the immediately subsequent graphs are shown from midnight to midnight, meals containing the food in question being eaten at 7 A.M., 12 noon and 7 P.M., except as snacks are otherwise indicated.

The let-down or recurrence of symptoms may be expected nightly at approximately 3 A.M. if symptoms are ameliorated for only 8 hours after a specific feeding, as shown in Section B of Figure 1. This helps to explain the "inconsiderate" patient who regularly disturbs other members of the family or routs out his physician within a few minutes of the same time each night. Good temporizing advice might be: "Go out and eat something you like and go back to bed." Patients are apt to find this out themselves sooner or later. The milk-

sensitive patient, for instance, often learns that raiding the icebox for a piece of cheese is more effective in her case than sleeping pills. Patients will discover the prophylactic value of eating before going to bed, for in this pattern a snack at 10 P.M. postpones the hangover for 4 hours. Whereas no one relishes a round of sick insomnia at 3 A.M., symptoms at 7 A.M. are more endurable.

Similarly, troublesome symptoms may be present from approximately 1 A.M. on if the subject is reacting on a 6-hour addiction cycle, as shown in Section C of Figure 1. Such a person is apt to sleep restlessly and fitfully unless the specific causative food is eaten during the night. It takes him a while to get started in the morning, but once he has had a good substantial breakfast which, of course, includes his addictant, he is likely to carry through reasonably well for the remainder of the day. However, there being a period of 7 hours between lunch and dinner, he tends to have a recurrence of symptoms on the way home from work. Needless to say, this is usually attributed to various other causes than to a food that he had for breakfast, repeated for lunch and did not have in the middle of the afternoon. At about this time the victim of progressive food addiction is likely to become "touchy" about the necessity of having his meals on time, for otherwise he is certain to become very tired, jittery, achy, and so forth.

When the addiction cycle is reduced to a 4-hour span in respect to a food taken in each meal, not only do withdrawal effects occur prior to each feeding but the presence of a superimposed daily gradient of symptoms becomes apparent. As shown in Section D of Figure 1, preprandial symptoms tend to be more severe in the mornings and gradually diminish in intensity as the day wears on. These people tend to become night workers. Nurses with this degree of food addiction will prefer to travel long distances to find employment where they may work consistently on the afternoon or evening shift, instead of rotating through the three daily shifts. They not only do not like to work in the morning, but they find it difficult to compete with others on the morning shift who do not have this adaptive illness.

As previously mentioned, the victim of chronic food addiction learns that his otherwise inevitable hangover may be effectively postponed as a result of eating frequently. Food at bedtime delays the onset of nocturnal symptoms. Eating between meals is likewise helpful. Storing some favorite morsels by the side of the bed to eat during the night for the relief of insomnia is more convenient than traipsing to the kitchen each night. Awareness that eating certain

foods or mixtures containing them is followed by a relatively relaxing and pleasurable effect not only leads to their oft-repeated use for this end but a person so "hooked" often expresses a craving for those favorite foodstuffs. When given foods or mixtures are consumed consciously or otherwise for this effect, it soon gives rise to the clinical picture of addictive eating (or drinking). This is illustrated graphically in Section E of Figure 1.

Addictive Eating as an Adaptive Manifestation

Continuation of eating schedules of the type described may result in progressive overweight, for the advancing food addiction process requires increasingly more frequent and larger doses of the specific addictant for adequate amelioration of the usual hangover. In this connection the person who has a voracious and relatively uncontrollable appetite for frequent feedings is of particular concern, though it is not claimed that all obesity may be related to sensitization illness. Since this factor in the etiology and persistence of obesity was described (18) in 1947, overweight patients with frequent eating patterns have usually been found clinically sensitive to corn, wheat, potato or some other common food high in the order of the causation of sensitivities as well as in calories per serving. Also, excessive eating of various foods may occur in the course of allergic reactions to nonnutritive specific food exposures such as coffee, or may be precipitated by other materials apparently acting similarly in respect to common mechanisms, as will be described subsequently.

When an individual is adapting in this manner, his particular cravings are intensified, making it virtually impossible for some to follow a calorie-oriented reduction program. Physicians have long been baffled by the patient's professed desire to reduce and by an equally resolute failure to restrict his food intake. The food addiction concept of obesity makes this lack of performance more understandable. If the wheat-sensitive patient, for instance, is geared to eating a total of 10 or 12 slices of bread daily in 6 feedings, an allowance of a slice a day, as in the majority of reducing diets, will be only slightly less intolerable than a similar reduction in the intake of the narcotic addict. Case histories illustrating this clinical problem will be the subject of another presentation (19).

Failure of Adaptation to a Slowly Absorbed Food Addictant

In addition to the good chronic compulsive eaters who are perennially satisfying their voracious appetites with manifest effect on

their waistlines, there are the less frequent intermittent or "binge" eaters who are able to behave thus for only a few days or weeks at a time. Though the food binger may have to stop eating in order to recover from cumulative gastrointestinal or other effects, his hangover and closely related specific cravings still persist for several days. As soon as he is capable of retaining nourishment, he starts eating the thing which, he has found from past experience, "agrees best" in his case. Although this terminates his hangover and satisfies his craving, it also initiates another chapter in the story of periodic illness.

This type of addictive eating may also lead to obesity but it is by no means a constant relationship.

Occasionally, adaptation to an oft-repeated and regularly eaten food may break down so that hangovers develop at 1 hour, at 30 minutes and sometimes immediately after eating, irrespective of recent previous doses of the same food. However, progressive food addiction ending in failure of this adaptation response is seen only rarely with relatively slowly absorbed, unrefined, native combinations of protein, carbohydrate and fat. In general, unrefined foods are not usually associated with addiction cycles (time of eating to time of onset of hangover) of less than 2 hours in length. But—and this is important—it is different when more rapidly absorbed forms of a food are consumed in oft-repeated feedings, as will be described subsequently.

Importance of Variations in Size of Dosage

One of the amazing characteristics of food addiction is the fact that this adaptive phenomenon is sometimes perpetuated by the oft-repeated ingestion of infinitely small quantities of even a slowly absorbed form of a given food. For instance, a patient who otherwise avoids corn in his diet may continue with the characteristic timed pattern of withdrawal effects and a chronic level of resulting symptomatology from regular ingestion of the corn starch employed as an excipient in a tablet of desiccated thyroid (20). Observations of this type, reflecting the extreme degrees of specific sensitivity which may be involved, emphasize the absolute necessity of avoiding incriminated foodstuffs completely. The obvious alternative to complete avoidance of such a food is missing the diagnosis and failing in specific treatment. This happens not infrequently, when patients are encouraged by their associates in the "Oh, a little bit won't hurt you" program.

At the other extreme, a massive dose will sometimes break through

a specific addictive response with the production of immediate post-meal symptoms. Patients subsequently found to be addicted to wheat sometimes give this type of history: Although still very fond of spaghetti dinners, such a person finds that they no longer seem to agree, though wheat in other forms is not suspected. Such massive dose effects are used to advantage in history taking, for they frequently suggest a specific food sensitization (13, 21).

Refined Foods, including Alcoholic Beverages

The term "refined foods" will be used to designate those dietary items which, as a result of processing, come to have a materially changed rate of absorption from the gastrointestinal tract. These include principally oils, crystalline sugars and alcoholic beverages.

Speed of absorption from the gastrointestinal tract is obviously related to dosage in food allergy, for dosage in the ultimate sense must be considered in terms of the amount of food entering the circulation per unit of time.

Oils are the least rapidly absorbed and the least allergenic food fraction (13). Although refined oils may carry sufficient active principles of the foods from which they are derived to perpetuate a specific food addiction, they are absorbed relatively slowly and are by far the least important of the various processed food fractions.

Monosodium glutamate as well as sirups and crystalline sugars derived from the simple hydrolysis of specific starches, or from the concentration of the native saccharine content of foods, also carry the active principles of the native materials from which they are manufactured (21-24). In my experience, glucose and dextrose made from corn and sucrose of beet origin are especially effective in this role, in spite of dissenting statements (25-30). As has previously been emphasized, small quantities of a specific excitant may effectively perpetuate an addiction response in view of the extreme degrees of specific sensitivity commonly involved. The effect of the admittedly small specific food content of crystalline sugars appears to be greatly enhanced in respect to its total dosage aspects by their extremely rapid rate of absorption.

For instance, one food addict clinically sensitive to beets as a vegetable and to coffee, maintained her specific addictions by drinking a total of 50 cups of coffee daily, each cup with 2 teaspoons of granulated beet sugar. According to her report when she was first seen, coffee (including beet sugar) was the only thing that would afford her any relief from her otherwise recurrent headache—but it had

to be taken every half hour during the day and two or three times at night for this "beneficial" effect. The addictive ingestion of food mixtures containing corn sugar in the form of dextrose or glucose is equally effective in perpetuating the more common phenomenon of corn addiction.

Alcoholic Beverages.—All "alcoholic" beverages carry the allergenicity of the constituent foods from which they are derived (21, 31). This statement is based on experience during the past 7 years in the test feeding of distillates prepared at 100 and 190 proof³ to specifically diagnosed food-sensitive patients. Doses of an "alcohol" content equivalent to 30 cc. of 100 proof were used, and only rarely were the subjects able to identify the origin of the diluted sample. The lower the proof at the time of distillation, the greater the apparent content of the native food. For example, beer (an infusion) carries more specific principles of malt and corn than does malt or corn whisky, and whisky in turn more than gin (grain neutral spirits). However, the increased speed of absorption of distilled beverages partially makes up for this lessened specific food content.

A person addicted to one or more of the cereal grains at the dosage level ordinarily obtained from eating them in their starch form and using spirituous beverages only occasionally, commonly develops a severe reaction immediately after drinking an alcoholic beverage derived from the same food. Indeed, a drink of beer or whisky so consistently precipitates a massive dose effect as to afford information of considerable diagnostic value (21); it usually indicates sensitivity to wheat or corn or both. More specific data as to probable food addictants may be secured from a detailed alcohol-intake history of discerning adults than from any other single aspect of a food history—provided the historian possesses a working knowledge of the foodstuffs entering the manufacture of particular alcoholic beverages.

Actually, the severity of these immediate reactions resulting from the occasional use of particular alcoholic beverages in the individual clinically addicted to one or more food constituents represented therein dissuades many specifically sensitized persons from further drinking. If one perseveres, however, in consuming a given alcoholic beverage in intermittent cumulative doses, so that he is receiving another alcoholized dose of a given food before he recovers from the effects of the last one, he may gradually adapt to this dosage level

³ Prepared and furnished through the courtesy of Hiram Walker & Sons, Inc., Peoria, Ill.

by developing the clinical features of "alcoholism." This was illustrated in an earlier case reference and will be presented in detail in a forthcoming article (32).

Other Effects of Alcoholic Beverages

One must be careful to differentiate between the effects of a given drink and those arising from a combination of the drink and simultaneously eaten food. The presence of a compatible alcoholic beverage (defined as one derived solely from compatible food sources) plus an incompatible food often makes a social drinker more sick than if he had consumed the incompatible beverage only. This seems to be best explained by the increased speed of absorption of a food in the presence of alcohol (33).

But the action of alcohol as a drug, or in the sense of stimulating the patient's general or nonspecific adaptation response (34, 35), or both effects together, must be carefully differentiated from the specific food effects of alcoholic beverages. As the modus operandi of the specific and nonspecific effects of alcoholic beverages are probably basically similar (17, 34, 35), these two actions are not easily separated, and this probably accounts for the fact that there has been no previous attempt to do so. I have drawn conclusions concerning the specific food effects of alcoholic beverages as a result of testing known food-sensitive patients with small (30 cc. at 100 proof) isoalcoholic samples of spirits derived solely from the same and from different foods. Details of these observations will be published in a subsequent article.

Addictive Drinking as an Adaptive Manifestation

The principal points in the development of the concept that "alcoholism" might be related to food addiction or other environmental adaptations or both will be described here only briefly. This interest, presented to date only in preliminary form (36, 37), developed a decade ago with the observation that patients giving a history of clinical intolerance to one drink of beer or whisky were subsequently found to be clinically sensitive to corn, or malt-wheat-rye, or the latter alone. Detailed histories as to the relative effects of different types of alcoholic beverages have since been obtained from all new patients. Laws and trade practices regulating the use of individual foods entering the manufacture of domestic and imported alcoholic beverages were studied. Finally, the ability of pure samples of alcoholic distillates prepared from single foods to reproduce the

symptomatology of patients sensitive to the same food, when iso-alcoholic quantities of spirits derived from compatible foods failed to do so, substantiated and materially extended the above preliminary impressions.

Interest in the possible sensitization-adaptation aspects of this subject was stimulated as the result of studying, in 1948, an abstaining former daily drinker of blended whisky. Following the complete avoidance of malt-wheat-rye, he developed an incapacitating withdrawal reaction which persisted for nearly 3 days. Then when wheat in its starch form was returned to his diet on the fifth day of wheat avoidance, he developed acute rhinitis, light-headedness, dizziness, ataxia and a degree of anxiety, remorse and depression indistinguishable from his former hangovers! When seen the following day, he said: "It's the most amazing thing to have a hangover when I have not had a drink for 26 months. Even the anxiety complex and the remorse are dead ringers for the way I used to feel. Why should I be remorseful after eating wheat?"

The 40 problem drinkers studied subsequently from the standpoint of adaptation to their diet and other environmental factors have also been found clinically sensitive to one or more foods represented in the manufacture of their alcoholic beverages of choice. Sensitivity to corn, malt-wheat-rye, grape and potato were encountered in that order of frequency. It is well known that alcoholic beverages consumed in this country are derived from foods in approximately the same order.

Addictive drinking and eating are essentially similar in that both appear most commonly to be manifestations of specific food sensitization. When the addictant is taken in a potable form in the presence of alcohol, the over-all process develops more rapidly; also, the time elapsing from the ingestion of an oft-repeated dose to the onset of the hangover is much shorter, and the withdrawal effects themselves are much more intense and demanding. Indeed, addictive drinking may be likened to the effect resulting from projection of a motion picture at quadrupled speed compared to the ordinary projection rate occurring with the addictive eating schedules of the same food in its starch form. The rate for sugars seems to be somewhere in between. Addictive eating and drinking schedules for extremely rapidly absorbed forms of food in highly sensitive individuals, whether due to such infusions as coffee, sugars or "alcoholic" beverages, are shown in the lower section of Figure 1. Although the severe addictive drinker may have difficulty in keeping down the

first morning dose of his old reliable hangover remedy, once he can retain a drink and then add another shortly, he gradually improves on this schedule as the day advances.

Sampling the membership of groups of abstaining "alcoholics"⁴ in respect to their allergy histories and drinking habits revealed the following pertinent factors: (1) Former problem drinkers tended to have chosen and used specific types of alcoholic beverages. (2) A positive present or past history of sensitization diseases—leaving the drinking problem itself out of this consideration—was common. (3) There was a definite trend for those with the most strongly positive histories in this respect to have developed the characteristic features of addictive drinking at younger ages and after relatively shorter periods of drinking experience than occurred in those with less positive histories of sensitization disease. (4) There was a tendency for both localized manifestations (rhinitis, asthma, pruritus, etc.) and constitutional effects (fatigue, myalgia, arthralgia, headache and other symptoms of brain dysfunction) to recur as part of the hangover response (38). (5) One or more of these chronic symptom patterns persisted in the majority of the abstaining alcoholics interviewed. (6) All continued to eat the foods represented in the manufacture of their favorite alcoholic beverage and continued to manifest the typical craving for the immediate effects formerly secured from drinking it. (7) Candy was the most commonly used food substitute following abstinence from drinking. (8) Most of the addictive drinkers interviewed had long since ceased to drink and eat simultaneously, having tried that a few times in their earlier days. This increased effect of an alcoholic beverage in the presence of edible foods is best explained on the basis of a greatly enhanced speed of absorption of foods in the presence of alcohol (33).

On the basis of detailed clinical material to be presented subsequently (19, 32), it may be said that practically all the symptomatology of so-called alcoholism has been induced experimentally in advanced instances of food addiction occurring in nonalcoholic individuals and even in the absence of intake of "alcohol." These manifestations include the clinical phenomenon of drunkenness (ataxia and hyperexcitability), the development of binge-like thirsts and appetites, all features of the hangover, "black outs," acute de-

⁴ Studied through the courtesy of local groups of Alcoholics Anonymous and the staff of the Keeley Institute, Dwight, Ill.

pressions and even a condition clinically indistinguishable from so-called pathological intoxication (19, 38).

Silkworth (39) was the first to suggest that at least certain types of "alcoholism" are basically allergic in nature. Although he was careful to point out that this state occurred as a result of a gradually increasing sensitization *by* alcohol, Haggard (40) and other critics of his point of view emphasized that there was no such thing as allergy *to* alcohol. In my opinion both statements are correct and not contradictory, if one may be permitted to interpret Silkworth's position that "alcohol" serves primarily as a vehicle.⁵

Failure of Adaptation to a Rapidly Absorbed Food Addictant

As progressive addictive phenomena seem to require a gradually increasing total daily intake of the specific addictants—usually resulting in the consumption of more and more frequent doses of increasingly larger size—a point of saturation may eventually be reached beyond which intake cannot be increased. Failure of adaptation in food sensitization is seen most clearly and frequently in the natural history of daily excessive drinkers. Sixty per cent of a group of 44 members of a neighborhood group of abstaining "alcoholics" entered this organization while still on an increasing or at least a constant daily intake of their alcoholic beverage of choice. Forty per cent reported a previous sharp decrease in their total daily consumption of spirituous beverages before voluntary abstinence. Several of those with a decreasing daily intake, or who had turned this "corner," commented that they might as well quit, for each drink now made them terribly sick. Lacking the desired immediately "beneficial" effect from a drink, on the one hand, and "blacking out" frequently, becoming morose and sick on the other, prompted them to abstain completely.

Other daily excessive drinkers did not give up so readily upon reaching this stage. Some found that they managed better for a time, at least, by switching to an entirely different type of alcoholic beverage.

Failure of adaptation in this sense, however, is a relative thing. At times a fairly satisfactory regimen may be reestablished at a lower level of dosage. At least this seems to be what is occurring

⁵ This is the interpretation that Doctor Silkworth meant, expressed in a personal interview shortly before his death.

when the corn, malt-wheat-rye or grape sensitive addictive drinker substitutes, respectively, candy containing corn sugar (dextrose or glucose), malt sugar (maltose) or cream of tartar (grape derived). Unfortunately, this common practice merely perpetuates specific addictions on a lower dosage notch. Although a person may adapt fairly satisfactorily to this cut back in supply, troublesome general symptoms are likely to continue and, most importantly, the craving for something stronger persists and has to be fought on a 24-hours-a-day basis. As far as is known, the characteristic craving phenomenon of advanced food addiction is only effectively curbed when all forms of all addicting materials have been completely removed from the patient's intake for several days and his general level of exposure to other environmental excitants acting similarly has been lowered.

There are still other intermittent or periodic excessive drinkers manifesting short-term failures of adaptation who seem to have greater degrees of addiction to specific foods than do the daily problem drinkers. They may be able to adapt to the quantity of beverage consumed for only short periods and then become too sick to continue drinking. Nevertheless their cravings persist and as soon as their gastrointestinal function will permit they usually resort to their favorite beverage. Others may go for fairly long intervals during which time craving for "alcoholic" beverages does not appear to be too troublesome. The causes for such long periods of abstinence and the identity of precipitating factors associated with intermittent drinking bouts in this type of "alcoholic" are not fully understood. Variations in endocrine response not readily measured at present may be involved. There may be some relationship to exposure to specific dietary excitants or various other environmental materials apparently acting similarly; these will be described forthwith.

Interrelationships between Specific Food Sensitization and Other Environmental Materials

Food sensitization in either the ordinary or the addictive sense usually coexists with specific sensitivity to other allergens. These include house dust, pollens, spores, and animal and insect emanations (13) as well as intolerance to tobacco smoke, paint fumes and other exposures capable of producing identical clinical responses. The various interrelationships that exist between specific addictive and other sensitization phenomena will be mentioned only briefly.

It is well known that bouts of excessive smoking are more likely to occur during food reactions; this is true whether the food is con-

sumed in its edible or potable form. Several diagnosed patients sensitive both to specific foods and house dust have reported a recurrence of craving for their food allergens after a massive dust exposure by inhalation or following an overdose of house-dust extract by injection. The craving in a dust reaction is sometimes so intense as to overwhelm the conscious desire to abstain from the food—in spite of the knowledge that a severe reaction will certainly follow transgression. Adequately dosed house-dust treatment, however, often assists in controlling other sensitizations, including the food addiction response. The same may be said for pollen therapy in patients having a combined pollinosis and food sensitivity.

In view of these effects, there may be instances of addictive eating or drinking which may not be primarily based on food reactions, in which the associated inhalant sensitivity may be the predominant cause of the behavior. For instance, I have seen the voracious appetite of dust-sensitive obese patients controlled effectively as a result of adequately measured injection therapy of house dust extract (41).

Coca (42) describes a patient whose long standing craving for and use of alcoholic beverages was effectively curbed simply by controlling his house-dust sensitivity. House-dust exposure in this case was reduced by treating the dust-generating objects in his home with Dust Seal.⁶ Since then, nearly 4 years ago, his craving for alcoholic beverages has ceased and it has not returned when he drinks socially. However, it did recur once after he had been working over an old mattress which had not been treated with Dust Seal.

Food addiction is also frequently associated with clinical intolerance to a wide range of petro-, sulfo-, chloro- and other halogen-derived chemicals (43–51). It seems to be more difficult for patients with this combined food and chemical problem to follow their prescribed diet when they are reacting to the inhalation, ingestion or injection of or contact with these so-called “irritants” which, in these instances, also seem to be sensitizers. Stated differently, the specific cravings for incriminated but avoided foods seem to be activated nonspecifically when a sensitive individual is exposed to unvented fumes from a gas-burning kitchen range, automotive traffic fumes, the ingestion of foods heavily contaminated with chlorinated hydrocarbon insecticide-oil sprays, or certain fumigants and numerous other exposures described to date only preliminarily. This aspect of the problem is under current investigation.

⁶ Manufactured by L. S. Green Associates, New York.

Diagnosis and Treatment of Food Addiction

The management of specific adaptive illness depends primarily upon the detection and avoidance of specific excitants. Since these are usually multiple, patients must be viewed in terms of the total load of offending materials to which they are currently exposed. Specific sensitization to dusts, pollens, spores, animal and insect emanations, drugs and chemicals must be evaluated in addition to foods. Lessening the total load in respect to nonfood offenders will sometimes enable a food-sensitive patient to adapt to his dietary excitants with relative absence of symptoms.

If troublesome symptoms persist after an attempt to manage inhalant and other specific excitants to which the patient is sensitized, food sensitization is then diagnosed. The presence of specific food addiction is suspected to all foods eaten regularly once in 3 days or more frequently in disease manifestations which may be on the basis of food sensitivity, until this is ruled out. Particular foods are completely avoided singly or in groups for a period between 4 and 10 days; this breaks their addiction cycles. A chemically uncontaminated form of the eliminated food is then returned to the diet as a test feeding under direct observation. The incidence of observable symptoms per unit of time is recorded prior to and following this experimental feeding, as originally worked out by Rinkel (52) and subsequently reported by Rinkel, Randolph and Zeller (13). This procedure changes the response of masked sensitization or food addiction to unmasked sensitization or ordinary food sensitivity. Under these circumstances the subject is liable to develop diagnostically significant acute and convincing symptoms immediately following the test feeding or within a period of 2 hours. The importance of obtaining a reaction sufficiently severe to convince a patient of cause and effect relationships is exceedingly important.

Coca's (53) technique of determining the premeal and postmeal pulse rates at 30-minute intervals for 90 minutes is a simple and accurate diagnostic method if one is experienced in its use. Its chief advantage is the fact that the pulse is often accelerated following the ingestion of another dose of a food when a person is still in a phase of addictive adaptation to previously ingested amounts of the same food.

However, the avoidance of a specific food for at least 4 days prior to its test ingestion is not only followed by a more clear-cut clinical reaction but often with a greater variation in the postprandial pulse.

The combination of the specific preparation and pulse determinations is more helpful, in my experience, than either the individual food ingestion test technique without pulse observations or the serial pulse determinations alone. The clinical response by itself is usually diagnostic in instances of advanced food addiction. In sensitizations of lower grade, one may detect evidence of cumulative or delayed reactions as a result of immediate variations in the pulse when an immediate clinical response is either absent or equivocal.

Based on the personal performance of approximately 25,000 individual food ingestion tests, it may be said that this procedure is not hazardous when a native form of a food is employed as the test material. However, former addictive drinkers who have been abstaining from all forms of a specific food should not be fed spirits derived from that food as a test feeding because this is believed to be the circumstance—occurring accidentally—responsible for precipitating episodes of so-called pathological intoxication.

Another satisfactory method of diagnosing specific food sensitivity is to fast a patient for 4 days, following which the effects of individual foods are observed as they are returned to the diet one at a time.

Elimination diets as recommended by Rowe (54) are also widely used but such general programs carry the possibility of including one or more offending foods in the basic dietary plan. Not only is food sensitization characteristically multiple but if highly restricted diets are continued for prolonged periods a spread of sensitivity to the substituted foods sometimes occurs.

Skin tests with food extracts are so unreliable that I have not employed them in the specific diagnosis of food sensitization during the past 15 years.

Therapeutically, offending foods are avoided as they are incriminated. A food to which one has been recently addicted must be avoided completely, since even small quantities of it may perpetuate an addictive response. This point cannot be overemphasized. Food addicts are always falling into the trap that they are no longer in trouble from a particular food simply because they can now take it as desired without obvious immediate symptoms—failing to associate their persistent level of distress or their recurring hangover effects with the chronic oft-repeated use of such a food. The rule is, *once a food addict, always a potential one*. Once a given food has been associated with high degrees of sensitivity, it must always be re-

garded with suspicion—provided it is returned to the diet in regular frequent feedings.

The most convincing way to answer the question of whether a given food is or is not currently tolerated is to suspect it of causing trouble if it is consumed in some form once in 3 days or more frequently. This dictum holds equally well for the new or old patient. Such frequently consumed foods should always be under suspicion until they have been omitted completely for at least 4 days and then returned to the diet as a test feeding. If test or cumulative doses are not followed by reactive symptoms, such an item may be continued in the diet in the previous amount and form.

We have pointed out that a food, previously avoided for several months, may often be returned to the diet in spaced feedings without the reactivation of the addictive response (13). After such a period of avoidance, it is suggested that the food be tried once in 7 days for a few times and if all goes well it may then be tried once in 5 days and sometimes may be tolerated once in 3 days. However, it is very unusual, if an individual has previously been addicted to a food, for it ever to be tolerated again when used more frequently than once in 3 days. Even then—and especially if it is consumed more often—readdiction is probable.

Sometimes an accidental dietary error will set off a train of binge-like addictive eating lasting several hours or days. Occasionally, a patient is unable to terminate such a reaction on his own volition, and in a few instances this has been accomplished by hospitalization under guard. Instances of this type resulting from the unrefined form of a food will be reported in detail (19). The same train of events is more likely to happen and the resulting clinical response tends to be of much greater intensity if the alcohol fraction of a given food is consumed under identical circumstances (32).

Clinical Applicability of the Food Addiction Approach

The principal purpose of this article has been to describe the clinical aspects of the body's adaptation to specific foods, particularly in respect to their timing and general features. Symptom syndromes have not been described except for pointing out the apparent roles of the food addiction process in obesity and in the addictive drinking of "alcoholic" beverages as a preview for the subsequent presentation of more detailed clinical data (19, 32).

Although it is premature to discuss the practical application of this point of view prior to these detailed clinical reports (19, 32),

concepts of mechanisms (17) and other practical points (55), a few preliminary statements may be made at this time.

A dietary program in which incriminated food addictants are completely avoided is more effective in the treatment of obesity than diets oriented only in terms of their calorie content. This greater effectiveness seems to be due to the fact that such regimens may be followed more easily and comfortably. This is apparently due to the absence of the craving for particular foodstuffs as well as of voracious appetite for interval feedings which so commonly characterize this illness.

Lessening the total load of other environmental excitants to which an obese individual is specifically sensitized is also helpful. Sometimes reduction of exposure to a single nondietary factor, such as house dust, will aid materially.

Abstaining addictive drinkers have been diagnosed and treated by means of avoidance of foods and other environmental excitants to which they are specifically sensitized. Patients so handled have reported a general symptomatic improvement as well as a lessening to an absence of their craving for spirituous beverages (or to effects thereof).

This emphasis carries the connotation that problem drinkers may become social drinkers, provided they eat and drink only compatible foods and their derivatives, or remain controlled in respect to house dust or other specific environmental materials. However, such a program in known food-sensitive patients has not been recommended. The greatest deterrent is the danger of a specific dietary "slip" reactivating the craving for the former alcoholic beverages of choice. There are several factors tending to push such a victim in this direction. One is the mental confusion and the relative lack of judgment and self-control in certain severe food reactions (13, 38). Another is the tendency for loss of recent memory and reversion to ingrained patterns of reaction under such circumstances. Also the similarity of the symptoms of a sharp food reaction under test conditions and those of their former hangovers may induce an "alcoholic" in remission to resort to his long-accustomed specific hangover treatment. If a drinking bout is initiated under these essentially test conditions there is a possible danger of inducing a reaction simulating pathological intoxication.

Although not recommended, a few food-sensitive abstaining alcoholics have indicated their desire to try it. When I have been convinced that such an individual was determined to make a trial

of social drinking, I have encouraged him to do it under my supervision. This accounts for the fact that thus far only a very few patients have been treated in this manner. One abstaining wheat-sensitive addictive drinker was found test negative to the edible and potable (alcoholized) forms of grape and cane. For nearly 4 years this person has avoided eating wheat, barley and rye and has used brandy or rum socially as desired without reactivating his former craving for whisky or indulging in uncontrollable drinking behavior. This case will be included in those to be reported in detail (32).

As with obesity and other clinical manifestations of sensitization disease, lessening the patient's total exposures to which he is adapting specifically may aid materially in controlling his symptoms. This appears to be the most feasible explanation in the case of Coca's (42) patient whose pattern of addictive drinking ceased coincidentally with the control of house-dust exposure.

Finally, the body's specific adaptation to environmental excitants (foods, dusts, etc.) and its general adaptation to alcohol as a drug may be involved in addictive drinking patterns; as far as the body's response is considered, these pathways may be somewhat similar. The precise role played in "alcoholism" by one, the other, both or additional factors remains to be evaluated.

Summary of Reversal of Effects Between Ordinary Food Sensitivity and Food Addiction

Intermittent or spaced feeding of a food to which one is sensitized (ingestion once in 4 days or less frequently) is associated with the immediate production of acute symptoms which usually convinces one of cause and effect relationships. Delayed reactions are usually absent. This, as illustrated on the left side of Chart I, is *food sensitivity as it is ordinarily considered*.

With higher degrees of sensitivity and the ingestion of repeated doses of a specific food while one is still reacting to previous amounts of the same food, a complete reversal of both immediate and delayed effects after eating often takes place. The subject feels relatively better following the meal compared to his hangover state before it. Consciously or otherwise, these recurring withdrawal effects are ameliorated by eating some more of the same food or mixtures containing it. This, as illustrated on the right side of the table, is *food sensitivity as it most commonly exists, or food addiction*.

Food addiction is one of the most common causes of symptoms in medicine (13). Victims of this subtle process rarely ever suspect

CHART I.—*Timing of Reactions in Food Sensitization*

	From intermittent or spaced feedings (once in 4 days or less frequently)		From oft-repeated feedings (once in 3 days or more frequently)
Immediate effects after eating	+	Reversal of Effects	0
Delayed effects (hangover)	0		+
	This is food sensitivity as it is ordinarily considered		This is food sensitivity as it usually exists, or food addiction

the causative foods to which they are specifically sensitized and adapted.

The detection of specific food addictants depends primarily upon their temporary avoidance. This tends to break the addiction cycle (or the adaptation phase of the reaction). Subsequent exposure following temporary avoidance usually results in a sharp and convincing test response in a manner analogous to an "alarming stimulus" in the sense described by Selye (34, 35). In other words, this change in frequency of use of a food causes the addictant to revert to the status of an occasionally eaten food (a change from the right to the left side of Chart I).

SUMMARY

Food addiction—a specific adaptation to one or more regularly consumed foods to which a person is highly sensitive—produces a common pattern of symptoms descriptively similar to those of other addictive processes. Most often involved are corn, wheat, coffee, milk, eggs, potatoes and other frequently eaten foods.

In contrast to the ordinary conception of food sensitization, the food addict is "picked up" temporarily after a meal containing his addictant, but is "let down" subsequently by the delayed recurrence of withdrawal effects or hangover-like symptoms.

These hangovers recur regularly early in the morning, during the night, prior to or between meals, provided the specific food is eaten in each meal at the usual hours. The addiction cycle, or the time elapsing between meals and the onset of the hangover, depends on

the individual's degree of sensitivity and the phase of adaptation to the specific excitant or excitants.

The oft-repeated consumption of a specific food or an alcoholic beverage derived from it relieves such hangovers temporarily. The more rapid the absorption, the faster the relief and the quicker the inevitable recurrence of the hangover. If the responsible food or its derivatives are taken often enough, specific hangovers may be effectively postponed for as long as this phase of adaptation persists. But as increasingly larger and more frequent doses become necessary for hangover prophylaxis or treatment, an exhaustion phase may eventually develop. This is seen most frequently in the natural history of addictive drinkers. When this develops, each drink is followed by an immediate acute reaction.

Specific addictive sensitization to foods is believed to be a major factor in the etiology of addictive eating and drinking. Specific sensitivity to house dust and perhaps other environmental excitants may be major causes in selected instances.

In addition to this specific effect of alcoholic beverages, alcohol also exerts a drug or nonspecific action to which chronically exposed individuals presumably adapt in the sense of the general adaptation syndrome. Both specific and general adaptation responses appear to be involved in the mechanism of the addictive drinking of "alcoholic" beverages.

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