

Asians, Asian-Americans and Alcohol

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Abstract—The association of flushing (vasodilation, reddening of the skin) with the alcohol use of Asians and Asian-Americans is examined. Historical changes in alcohol use, recent secular changes in alcohol use, and marked differences in consumption among Asian populations and among Asian-Americans of the same national origins, as well as the lack of reduction of sex differences among flushers, indicate that flushing has little influence on alcohol consumption. Social, psychological, and cultural influences seem to be more adequate explanatory devices with regard to Oriental alcohol use.

Keywords---Alcohol, Asian-Americans, Asians, flushing, sex differences

The purpose of the present article is to review the evidence supporting the belief that genetic factors and the biological physiological pathways by which they supposedly operate cause persons of Asian ancestry to drink less alcohol and manifest fewer alcohol-related problems than persons of Caucasian ancestry. Data will be presented with regard to the alcohol consumption of various Asian groups in Asia and the United States, both contemporaneously and across time, and related to the now well-known phenomenon of flushing (vasodilation, reddening of the skin) following alcohol use among Orientals. While flushing is not the only physiological mechanism that may mediate ethnic group differences in alcohol use, it is an obvious one because it is a phenotypically distinct, usually aversive response to alcohol that is probably genetically transmitted. The role of biological and social influences on alcohol use will be evaluated, followed by a discussion of specific sociocultural influences that may account for the reduced alcohol intake in various Asian groups. There is no necessary contradiction between biological /physiological versus sociological explanatory modes, and their influences may be correlated or interactive.

One point should be made here in regard to the distinction between normal alcohol use, problem alcohol use, and alcoholism. For the purposes of this article, no distinction is made between the factors that determine any of the above phenomena, assuming instead that problem alcohol use and alcoholism are simply the extreme of a single normal distribution of alcohol use.

The disease model of alcoholism supports the view that the factors leading to alcoholism are, in fact, qualitatively different from those underlying normal alcohol use. One prediction of the disease model might be that the distribution of alcohol use would be bimodal, with a consistent will be evaluated, followed by a discussion of specific group of heavy users being found regardless of overall group rates of consumption. Analyses of large samples on levels of and problems with alcohol use (Hilton & Clark 1987; Foch et al. 1984) suggest that the single distribution theory may adequately account for the alcohol consumption data. It should also be noted that there is compelling evidence for the influence of social/cultural factors on group definitions of what constitutes problem alcohol use and alcoholism (Peele 1987a, 1984), a topic that will also be addressed in the present article. While it is possible that the development of alcoholism for small subsets of individuals within groups is largely determined by specific genetic factors, the present authors believe that most of the variance of alcoholism is accounted for by the more general genetic and environmental influences that determine normal alcohol use.

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THE FLUSHING RESPONSE

The first researcher to study flushing and to investigate racial ethnic differences in flushing was Wolff (1972). Using alcohol challenge tests, Wolff assessed flushing through photometric measures of skin reflectance and found that adult persons of Mongoloid ancestry generally flushed, while persons of Caucasoid ancestry generally did not flush following the administration of a comparatively small amount of alcohol. Wolff also reported on a second study of Mongoloid and Caucasoid infants who were given small doses of alcohol. These infants, without previous exposure to alcohol, showed that same kind of differences between flushing across racial ethnic groups as the adult subjects. Differences between groups thus did not appear to be the result of the development of tolerance through habituation.

Wolff suggested that flushing, in itself embarrassing, provides visible evidence of alcohol use, and that flushing is accompanied by other unpleasant symptoms that might have the effect of reducing alcohol use and abuse in groups who flush. Wolff (1973) also found that persons of mixed Asian-European ancestry were similar to persons of Asian ancestry in their flushing response (see also Johnson et al. 1987b; Wilson, McClearn & Johnson 1978). This set of data suggested that flushing probably was inherited as autosomal dominant gene. In addition, Wolff took note of the fact that there are groups of Mongoloid ancestry, such as American Indians, including Aleuts and Esikmos (Inuit), who also flush with considerable frequency, but are not abstemious. He suggested that flushing might lead to a reduction of alcohol use only in relatively intact cultures, and recent data support this interpretation (Johnson 1989). Hence, there is an absence of any "immunizing" effect among American Indians, despite the fact that they, like persons of Asian ancestry, are likely to flush following alcohol use (Goedde et al. 1986). Wolff's findings led many researchers to become interested in the flushing response, and the metabolic bases of Mongoloid-Caucasoid differences soon came under investigation. Two major liver enzymes, alcohol dehydrogenase (ADH) and acetaldehyde dehydrogenase (ALDH), are primarily involved in alcohol metabolism. Both of these enzyme systems exhibit genetic polymorphism's. Differences in rate of reaction across isozymes that are related to group differences in alcohol use suggest a genetic basis for individual and group differences in alcohol metabolism that, in turn, influence alcohol consumption. There is a vast literature on this topic, much of which has to do with comparisons of Mongoloid-Caucasoid ADH and ALDH metabolism, and a portion of this literature has to do with the association of ADH and ALDH metabolism with flushing as well as other alcohol-related symptoms. Reviews of this literature include those of Chan (1986), Deitrich and Spuhler (1984), and Agarwal, Harada and Goedde (1981).

Researchers report substantial differences in ADH and ALDH enzymes between Mongoloids and Caucasoids, although there is considerable variation in this deficiency among different Mongoloid groups (Goedde et al. 1985). About 50 percent of Mongoloids do not have the ALDH-I isozyme. This deficiency results in impaired acetaldehyde oxidation leading to facial flushing and to other cardiovascular symptoms (Inoue et al 1984; Agarwal, Harada & Goedde 1981; Harada, Agarwal & Goedde 1981). Deitrich and Spuhler (1984) concluded that flushing was found only among individuals lacking in DH-I. A recent report (Miller et al. 1988) suggests that the flushing response is, in fact, due to a rapid histamine response that may or may not be related to the ALDH-I deficiency.

Nearly all of the early reports of group differences in ADH and ALDH activity and associated symptoms, such as flushing, were based on data obtained from the livers of cadavers. It is now possible to assess enzyme activity through the use of hair follicles (Goedde, Agarwal & Harada 1980) or through blood cell ALDH activity (Inoue, Fukunaga & Yamasawa 1980). Both individual and racial differences in enzyme activity appear to have genetic bases (Goedde, Agarwal & Harada 1980).

Studies of families from Hawaii, Taiwan, and Korea (Nagoshi et al. 1988; Johnson et al. 1984; Park et al, 1984; Schwitters et al. 1982a) indicated considerable familial transmission of self-reported flushing, and it is likely that this transmission is genetically based. With regard to flushing, the present authors found it useful in these latter studies to distinguish between first flushers (i.e., those who flushed after consuming one drink or less) and slow flushers (i.e., those who required more than one drink to produce the flushing response). The distinction between fast and slow flushers is not arbitrary. Wolff's original studies (1973, 1972) assessed flushing after only minimal doses of alcohol, whereas a sufficient amount of alcohol consumption could overwhelm the metabolism of a person

with a normal ALDH system. Although nearly all Caucasians have normal ALDH-I isozymes, Western literature is replete with descriptions of persons flushed with drink. In turn, the present authors (Johnson et al. 1984) have indicated that fast flushing was almost totally limited to persons of Mongoloid ancestry, while some slow flushing was found among Caucasians. It is likely that the ALDH-I isozyme deficiency manifests itself as self-reported fast flushing, and the above studies demonstrated the familial transmission of this trait.

FLUSHING AND ALCOHOL USE

Flushing, at least fast flushing, seems to be very closely associated with the absence of the ALDH-I isozyme and is under substantial genetic control. Racial/ethnic groups should not differ substantially in this variety of flushing. Overtime or over different areas of residence unless fast flushing has a marked influence on Darwinian fitness. Fast flushing and the ALDH-I deficiency are almost totally absent in Caucasian populations and highly present in Mongoloid populations. Lee's (1987, 1986) reviews of Chinese literature, in fact, clearly indicated that flushing following alcohol use was a well-known phenomenon throughout Chinese history. It is also known that levels of alcohol use and abuse are, in general, greatly reduced in Mongoloid as compared to Caucasian groups (e.g., Klatsky et al. 1983; Wilson, McClearn & Johnson 1978). It was only to be expected that many researchers would attempt to connect the two phenomena.

Since Wolff's report (1973), there has accumulated a substantial body of data to indicate that, in fact, the occurrence of flushing after alcohol use is negatively correlated with level of alcohol use and/or abuse in Mongoloid subjects living in North America (Ewing, Rouse & Aderhold 1979; Zeiner, Parades & Christensen 1979; Hanna 1978; Reed 1978) and Japan (Suwaki & Ohara 1985; Harada et al. 1982). The present authors' studies found significant negative correlations of fast flushing, but not slow flushing, with alcohol use among Chinese and Japanese subjects living in Hawaii, as well as among native Koreans and Taiwanese (Nagoshi et al. 1988; Park et al. 1984; Schwitters et al. 1982a). It should be noted that these correlations are typically moderate (around -0.30 to -0.40 at most) and that the focus on differences in alcohol use between groups ignores the tremendous variation in usage within groups. Much of the literature having to do with Asian and Asian-American alcohol use lumps all groups together. Chinese, Japanese, and Koreans all frequently show the 25% for Koreans, 44% for Japanese, and 50% for Han Chinese (Goedde et al. 1985). If nonsecretion of ALDH-I is an influence on alcohol use, then Caucasians should drink the most, Koreans next most, and Chinese and Japanese should be tied for least consumption. In fact, homeland - Koreans who use alcohol consume substantially more of it than do Caucasians (Park et al. 1984), while Taiwanese Chinese (Johnson et al. 1984; Park et al. 1984), Hawaiian Chinese (Acheron 1989; Danko et al. 1988; Johnson et al. 1984; Schwitters et al. 1982b), and mainland Chinese-Americans (Chi, Kitano ~ Lubben 1988) drink very little. Japanese Americans in Hawaii and on the U.S. mainland are intermediate in use and, in Hawaii, now drink about as much as do Caucasians (Danko et al. 1988). A study by Suwaki and Ohara (1985) indicated that flushers versus nonflushers in Japan do not differ greatly in alcohol use, with nonflushers drinking somewhat more often and preferring sake to beer, while flushers enjoy drinking but prefer beer to sake. Differences in alcohol use of Asians versus Caucasians, across Asian groups or across Asian American groups, are not the sort that would be predicted from flushing or ALDH-I deficiency.

ALCOHOL CONSUMPTION ACROSS TIME

Lee (1987) has reviewed historic Chinese literature and law as they relate to alcohol consumption, and has shown that there have been periods in Chinese history when alcohol use has been very heavy and periods in which use has been extremely low. Lee's data certainly do not support the belief that absence of the ALDH-I isozyme (which cannot have shown fluctuations in frequency across dynasties) has had an inhibitory effect on Chinese use of alcohol.

Ahem (1989) reviewed the literature having to do with alcohol use surveys conducted in Hawaii from shortly after World War II to 1985. There have been substantial secular changes in alcohol use among persons of Asian ancestry overtime, all in the direction of increased use. A survey conducted after Ahem's report showed that persons of Japanese ancestry now drink about as much as persons of Caucasian ancestry in Hawaii (Danko et al. 1988). Across all surveys conducted in Hawaii, persons of Chinese ancestry drink the least, but they are also increasing their alcohol use.

Marked changes in alcohol consumption have also been documented in Asia. Yamamoto, Yeh and Lee (1986) reported an eightfold increase in alcohol use in Korea over a 20 year span and a threefold increase in consumption and a hundred fold increase of problem drinking in Taiwan over a 40-year span. Secular changes of this magnitude lead to doubts regarding the "immunizing" influence of ALDH-I

Sex Differences

A genetic-biological explanation of Mongoloid Caucasoid differences in alcohol consumption also encounters difficulty in the area of sex differences. Sex differences in alcohol use and in risk of becoming problem drinkers usually have not been discussed as they relate to genetic-biologic explanations of alcoholism, yet sex differences are ubiquitous and generally far larger than racial/ethnic differences in normal or problem use (Nace 1987).

If an "alcohol gene" exists, it would likely have to be on the X chromosome to account for the kinds of sex differences that typically are reported. The existence of sex linkage is simple to ascertain because there should be no genetic basis for father-son resemblances on X-linked characteristics.

Sex differences in flushing are slight and almost certainly a consequence of the lesser body weight of women than of men (Johnson et al. 1984). There are very substantial sex differences in alcohol use among Asians and among Asian-Americans in all groups studied (Klatsky et al. 1983). Sex differences among Asian-Americans in Hawaii are diminishing across generations in America, but are large, as compared with sex differences among Caucasians or Hawaiians (Danko et al. 1988). If ALDH-I deficiency/ flushing had any substantial influence on alcohol consumption, one would expect sex differences among Asians to be far less (rather than more) than sex differences found among other groups.

Historic changes, recent secular changes, sex differences, and national differences in alcohol use all suggest that a genetic-physiological explanation through the flushing response of Asian alcohol use has little support. It seems likely that differences of the sort described above have social-psychological rather than genetic-biological bases.

Sociocultural Influences and Alcohol Intake

There is more direct evidence for the important influence of social-cultural factors on levels of alcohol use and abuse in different ethnic groups. Across all Hawaiian Racial ethnic groups from whom the present authors have obtained data, alcohol use in Hawaii is intermediate between the lower levels found in Asia and the higher levels found in the mainland United States. As might be expected, if such community wide norms for alcohol use have an influence on use, it was found that Hawaiian residents of Chinese and Japanese ancestry had lower mean levels of use if they were born in Asia than if they were born in Hawaii (Johnson et al. 1987b). On the other hand, Hawaiian residents of Caucasian ancestry had lower mean levels of alcohol use if they were born in Hawaii than if they were born on the mainland. These differences held up even after controlling for the age of the subjects.

Several studies have found that acculturation of recently arrived immigrant groups into American society (i.e., westernization) is associated with increases in alcohol use and/or problems in these groups. Acculturation, as measured by length of residence in the United States, language use and social activities or inter ethnic friends and dating has been found to be positively correlated with alcohol use and possible problem alcohol use among Hispanic-Americans in general (Caetano 1987), Mexican-Americans (Caetano & Medina Mora 1988), Puerto Rican Americans (Fernandez-Pol et al. 1985), and Asian-Americans living on the U.S. mainland (Sue, Zane & Ito 1979). With regard to group differences in alcohol use between Caucasian and Mongoloid groups, it thus becomes important to define those aspects of culture in both groups that may be related to alcohol.

Social, psychological, and cultural interpretations of group differences in alcohol use are sometimes based on attributes common to Chinese, Japanese, and Koreans. There are very substantial differences in alcohol consumption between the three groups, yet some aspects of their common cultural history have stayed constant while consumption has changed markedly. Consequently, one can question explanations of a general Asian abstemiousness based on common cultural elements.

One cultural explanation that can be mentioned, but quickly dismissed, is the influence of Confucianism, which sometimes is claimed (e.g., Chi, Kitano & Lubben 1988) to lead to an avoidance of excessive alcohol use as a result of an emphasis on order, propriety, and harmony. Korea and China have been heavily influenced by Confucian philosophy, yet Koreans are heavy users of alcohol, while Lee (1987) has shown that there have been extremely wide swings in alcohol use in China across the centuries. Korean alcohol intake increased about eight fold between 1960 and 1981, Taiwanese Chinese intake increased tenfold between 1957 and 1984, and Taiwanese cases of diagnosed alcoholism increased a hundred fold from the mid-1940s to the mid-1980s (Yamamoto, Yeh & Lee 1986). Confucian philosophy does not appear to be an effective constraint on alcohol consumption at present.

One cultural interpretation that presumably would hold almost equally across homeland Chinese, Koreans, and Japanese as well as (to a degree) Asian-Americans of the same groups is that these cultures are concerned with shame and losing face. Shame results from status incongruity or by making a fool of oneself, while guilt results from failure to fulfill norms of role reciprocity (Lebra 1971). Drunken comportment certainly provides a great opportunity to make a fool of oneself, and Asian cultures have been described as shame-oriented cultures (e.g., Benedict 1946—with regard to Japan; Mead 1943). However, empirical data show a high degree of East-West (Taiwan/Korea-United States) similarity in the constituent elements of and level of shame and of guilt, with Taiwan (low alcohol use) and Korea (high alcohol use) being very similar to one another (Johnson et al. 1987a). If a strong need to avoid losing face is present among Japanese, this need seems to vanish with a few drinks, as can be attested to by almost anyone who has participated in the night life of Japan (e.g., Morley 1985; Theroux 1975). If group differences in shame exist at all, they do little to reduce alcohol use among homeland Koreans or Japanese, although they might be among the variables involved in Chinese abstemiousness, to the degree that the tendency still exists. Racial/ethnic differences in guilt and shame are almost nonexistent between persons of Chinese, Japanese, and Caucasian ancestry in Hawaii (Nagoshi 1980; Souza 1977; Winn 1973) despite the substantial differences in alcohol consumption between Chinese-Americans on the one hand, and Japanese-Americans on the other hand.

The existence of extended families among homeland Asian American families might be a factor leading to reduce alcohol consumption. Family elders control families, and as a consequence have the means to behavior of younger family members. The family elders probably is less in America (either Hawaii the mainland) than in Asia, where it has certainly decrease since World War II (Akiko 1984; Fukutake et al. 1981).

The loss of elders' power may well be an important influence in facilitating the increase in alcohol use among Asian and Asian-Americans. Within-group differences in alcohol consumption may be a direct consequence of loss

Of elders' influence on alcohol consumption or less directly, through being unable to keep offspring from interacting closely with groups, such as Caucasians, who are more prone to use alcohol than are Chinese-Americans or to a far lesser degree) Japanese Americans. Unfortunately, while a good deal is known about secular changes in Asian and Asian-American family structure and also about changes alcohol consumption, no research links them in the sense obtaining data concerning family structure and alcohol use data from the same subjects.

It could be argued that such persons of Asian ancestry homeland Chinese and Chinese-Americans drink less because they drink for more healthy reasons than do other groups, when they drink at all. For example, it would not be difficult to argue that alcohol use when sharing a joyous a Jon (e.g., a Chinese wedding, where the very best Scotch flows quite freely) is a better (psychologically healthier) reason for drinking than is drinking to forget what kind of a person one is. Cross-ethnic comparisons show little difference across groups in relative frequencies for endorsement of reasons for drinking, for not drinking for ceasing to drink (Johnson et al. 1985). While race/ethnicity has little influence on reasons for using alcohol, there is more substantial association between consumption that must be a consequence of as yet not fully understood and reasons for use, with heavy drinkers far more often more distal causes, but it does have the merit of being able drinking for pathological reasons (Johnson et al. 1985).

Place and circumstance may be important, however Chinese generally drink at formal gatherings attended by most members of the family from the aged to the very young. Despite the bottle of excellent Scotch at every table, ethnic groups differ in their judgments of what constitutes circumstances are such that moderation is expected and obtained. Chinese who do use a good deal of alcohol moderately good job of making their drinking conform usually

are those who go to bars (Chi, Kitano & Lubben, 1988). Drinking in bars with male age mates and work exceptions, such as people who cannot stop once they colleagues is very common practice in homeland Japan and begin. Korea, and also in Hawaii. The abstemious Chinese generally are like Jews, Italians, and Greeks in drinking practices, while Japanese and Koreans are more like Northern Europeans or American blue-collar drinkers in drinking style.

Peele (1987a, 1987b) has put forward a proposition low end of the alcohol use continuum may drink less to regarding the low rate of alcohol use among Chinese-Americans (as well as of Americans of Jewish ancestry). He limited his comments to these two groups, but they could be extended to any other group that exhibits relatively low alcohol use, such as Taiwanese Chinese and, presumably, contemporary mainland (People's Republic of China) Chinese. Peele's position is that both Chinese- and Jewish Americans use alcohol and have no negative feelings toward alcohol, but are totally unaccepting of the unpredictable, sometimes bizarre and dangerous behavior that often accompanies heavy alcohol use. This belief is related to the shame (status incongruity) hypothesis advanced above, except that controls come more from others and less from self than is the case for shame or losing face.

The present authors attempted to test this proposition by asking subjects from each of a number of racial/ethnic groups which of a number of behaviors they regarded as indicative of problem drinking (Danko et al. 1988). The behaviors ranged from the seemingly innocuous, such as having a drink with friends at one's own home or at their home, to the clearly problematic, such as having blackouts.

The assumption was that if Peele was correct, groups low in alcohol use would regard more behaviors as indicative of problem drinking. However, this was not the case. Further more (as will be discussed below), judgments of what constitutes problem drinking are far less closely related to reported consumption than are judgments of what constitutes normal drinking. While Peele's explanation for cultural differences in heavy drinking and alcoholism is an appealing one, the data do not support it, at least not in Hawaii.

The present authors advance another sociocultural explanation for Caucasian-Asian, inter-Asian, and Asian American group differences in alcohol consumption. This explanation, like Peele's emphasis on group differences in tolerance for problem behavior, is a proximal explanation to explain a major share of the variance in both group and individual differences in alcohol consumption. It may be argued that racial ethnic groups differ, sexes within racial/ethnic groups differ, and individuals within given racial/ethnic groups differ, and that most people generally do as with their ideas about normal use. Admittedly, there are Another caveat must be added. Even if there were a perfect correlation between reported consumption, across ethnic groups or across individuals within ethnic groups, direction of causality is unclear. Persons whose judgements of what constitutes normal consumption fell at the match their norms, or persons who drink less might, as a consequence, have low norms, or both might be true simultaneously. It may be argued that norms influence consumption, at least far more than the reverse, for two major reasons. First, most people have substantial opportunity to develop ideas about what constitutes normal alcohol use long before they become alcohol users. Persons not given such an opportunity, such as Latter Day Saints and conservative Baptists, have a high probability of becoming problem drinkers if they drink at all. Second, if use is a determinant of norms, rather than norms influencing use, one would expect use to influence different kinds of norms in roughly the same fashion. As will be shown below, this is not at all the case.

The present authors obtained data from 928 subjects from Hawaii's five major ethnic groups (persons of Chinese, Caucasian, Filipino, Hawaiian or part Hawaiian, or Japanese ancestry) with regard to their ideas concerning what constitutes normal and problem alcohol use and with regard to reported consumption (Danko et al. 1988). Subjects were asked to report on the quantity and frequency of alcohol use that they would consider normal use and what they would consider problem use. They were then asked about quantity and frequency of alcohol use that other people would consider normal and problem drinking.

Group means of own judgments of what constitutes normal alcohol use were almost perfectly correlated with group means of reported consumption across the 10 (five ethnic x two sex) groups. Within given ethnic x sex groups, the median correlation of own judgment of normal use with reported consumption was 0.72 for males and 0.44 for females currently using alcohol. Other norms were significantly associated with reported use, but to a far lesser degree.

As described above in the discussion of Peele's position, these subjects also judged whether or not each of a number of alcohol-related behaviors was indicative of problem drinking. Own judgments of what constituted problem consumption and judgments of what most people think (cultural norms) constitutes problem consumption were only weakly related to own consumption for individuals within groups, while judgments of the problematic nature of alcohol-related behaviors by different groups were not associated with group mean consumption. It should also be noted that there was less within and between group variability for problem alcohol use norms. It appears that own judgments of what constitutes normal drink less by making them aware of the nature of what people in general believe to be normal use, a surprisingly low four drinks a week. If so, it might be possible to influence problem drinkers to by making them aware of the nature of what people in general believe to be normal use, a surprisingly low 4 drinks a week. While the direction of causality cannot be established from these data, one can say that judgments of what constitutes normal alcohol use can predict ethnic x sex differences in consumption and individual differences within a ethnic x sex group to a far greater degree than can knowledge of flushing and symptoms associated with flushing.

Evidence for the hypothesis that perceived norms for alcohol use precede the development of alcohol use and abuse comes from a follow-up study to the study by Danko and colleagues (1988) in which a sample of 183 families (biological parents and one adult offspring) across several racial ethnic groups were recruited at the University of Hawaii and administered a set of measures on alcohol use and norms (Johnson et al. In press). Within individual intercorrelations of alcohol use, fast flushing, and perceived normal alcohol use were consistent with the findings already described. Of special interest were the findings of significant familial transmission (i.e., high parent-off spring correlations) of alcohol use norms and of significant influences of parental norms on offspring alcohol use.

Alcohol norms are probably correlated with people's expectations of mood and behavioral responses to alcohol. Sociocultural variables, such as parental socialization and peer group norms, undoubtedly influence the development of perceptions of levels of normal and problem alcohol use in the same manner that they influence the development of such expectations. These expectations of alcohol response have also been found to be highly predictive of levels of alcohol use and problems among normal drinkers and alcoholics (Leigh 1989). There is evidence that these expectations are developed early in life (Miller, Smith, & Goldman In press) and are predictive of later alcohol use (Christiansen et al. 1989). In the latest Hawaii study (Johnson et al. In press), these expectations were also found to transmitted familiarly and related to levels of alcohol use.

Although the present authors' weak measure of acculturation did not mediate the correlation between alcohol use norms and own reported alcohol use (Danko et 1988), the literature cited above does indicate that it is likely that acculturation is an important factor in the establishment of and conformity with these norms. Descriptions of historical changes in alcohol use and abuse in Asia (1987) and in the United States (Peele 1984) suggest complex set of economic and political factors can result in major shifts in mean alcohol consumption and prousage, with changes in norms for alcohol use as precede as to follow such shifts.

CONCLUSION

The present article, having to do with genetic sociocultural influences on racial ethnic different alcohol use, is supplementary to that of Peele (1986) Searles (1988), who evaluated the evidence a influences on individual differences in response to and risk for problem drinking within the Caucasian group. These authors also found evidence for genetic involvement to be relatively convincing.

Genetic models of the d development of alcohol use and alcoholism can only account for variations in these phenotypes within defined groups. While it is possible that the genetic mechanisms operating with groups can also Produce differences between groups, the large group differences actually found and the secular changes described above clearly argue against the importance of such genetic mechanisms. Asian groups in Asia and in America are quite similar in flushing yet differ substantially in alcohol use at any given time, and they also have substantially changed their levels of alcohol use over time. Within a given racial/ethnic group, persons who flush or do not flush differ significantly or else they differ significantly but trivially in consumption. The genetic-biological explanation for supposed Asian abstemiousness, as a result of racial differences in enzyme activity, signaled by flushing, has very weak empirical support.

Social-psychological variables that vary across Asian groups and across Asian-American groups at any given time and across time have not been fully assessed as they relate to attitudes toward and use of alcohol. This deficiency in social-psychological data is in part a consequence of the fact that granting agencies currently favor a genetic disease model of alcoholism, even in the face of the kinds of evidence presented herein. Social-psychological research is likely to be unsupported, and as a result what is known about social-psychological variables may be insufficient. But what is known is already sufficient to support the belief that differences in alcohol use between Asians and Caucasians, between different groups of Asians, and differences of the same group of Asians over time or location have important sociocultural/environmental bases.

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