

Effects of Alcohol

The first effect of alcohol is the impairment of judgment. Judgment is the general name given to various decision-making aspects of human behavior. Social inhibitions, self-evaluation, risk assessment and perception of reality are all included under judgment. Alcohol depresses learned cultural and social inhibitions. This can result in the release of suppressed hostility or other inappropriate behavior. Alcohol also impairs an individual's self-evaluation, the ability to judge one's own behavior or performance in a particular situation. When individuals are required to perform a specific task while in an alcohol-free state and later while intoxicated, they will consistently rate their performance while intoxicated as better than when alcohol free. Independent observation of these individuals clearly demonstrates that when intoxicated, they performed the task slower and with more errors than when alcohol free.

Alcohol also has the ability to create a feeling of well being known as euphoria. Because of this artificial sense of euphoria, combined with an increase in pain threshold, an intoxicated individual may ignore minor injuries. Serious injuries may be considered trivial with no attempt made to seek the necessary medical attention. Because of the induced state of euphoria, an intoxicated individual's perception of reality may be altered.

Another aspect of judgment is that of risk assessment. Each person has the ability to determine what risks are acceptable to him and to understand the consequences of his actions. An intoxicated individual may accept risks which would be unacceptable when alcohol free.

Other aspects of an individual's mental faculties are also affected by alcohol. Intoxicated individuals may exhibit a loss of memory such as the inability to recite the alphabet. Intoxicated persons sometimes have difficulty in remembering the date and the time of day. Intoxicated individuals may demonstrate a shortened attention span and the inability to concentrate on a particular task.

Alcohol also has significant effects on the physical faculties.

The sense of vision and visual perception, hearing, smell and taste are all affected by alcohol. Alcohol can cause a blurring of vision because it depresses the coordination between the eyes such that they do not focus on the same spot, as in normal vision. As the alcohol concentration is increased, this results in diplopia (double vision). Alcohol lengthens the glare recovery time. Glare recovery is the adjustment back to normal vision after a bright light has been shined in the eyes. Alcohol increases the time required for the eyes to make this necessary adjustment for night driving. When intoxicated, dim lights are more difficult to perceive, and colors are harder to distinguish than when alcohol free. An intoxicated individual may demonstrate the effect called light fixation. The intoxicated person's attention becomes fixed on a flashing light. It is not uncommon for police vehicles that are stopped on the shoulder of the road with their flashing lights on to be struck by another vehicle driven by an intoxicated person because of this effect. An intoxicated individual will also demonstrate the effect known as Positional Alcohol Nystagmus. When an intoxicated individual places his head in a lateral position, it can cause rapid involuntary eye movements. This is why intoxicated persons sometimes complain of the room spinning around. Because of the rapid eye movements, the individual perceives that the room is moving. Another aspect of the effects of alcohol on visual perception results in the

distortion of distance estimation. An intoxicated person will consistently overestimate distances and, as one consequence, will underestimate speed when operating a motor vehicle. See Table 3.

| <u>BrAC (g/210L)</u> | <u>Driving Skill</u> |
|----------------------|---|
| < 0.010 | Divided Attention |
| 0.030 - 0.039 | Vigilance |
| 0.040 - 0.049 | Perception, Visual Functions |
| 0.050 - 0.059 | Tracking |
| 0.060 - 0.069 | Cognitive Tasks, Psychomotor Skills, Choice Reaction Time |

Table 3

Alcohol also impairs hearing perception. Although no direct effect has been shown on the physical mechanism of hearing, alcohol raises the minimum level of noise to which the person will respond. Noises that are usually heard are ignored due to lack of attention. One consequence of this is that an intoxicated individual will raise his voice to compensate for this perceived hearing loss.

The nasal nerves are sensitive to even small quantities of alcohol. Alcohol very quickly dulls the sense of smell. Because of this, the drinker quickly becomes unaware of his own odor. Alcohol also dulls the taste sensation resulting in most food tasting bland when an excess of alcohol has been consumed.

Alcohol also exerts its effects on other physical faculties. Muscular coordination is affected by alcohol. Because of the effects of alcohol on the nerves and muscles, the reaction time for performing a complex task is dramatically increased. Alcohol depresses the nerve transmission to the muscle, which affects the performance of the muscle. At low levels of alcohol concentration, fine muscular coordination is affected. As the alcohol concentration increases, larger groups of muscles are impaired, affecting gross muscular coordination. If the alcohol concentration continues to rise, the involuntary muscles are affected and respiration ceases, resulting in death.

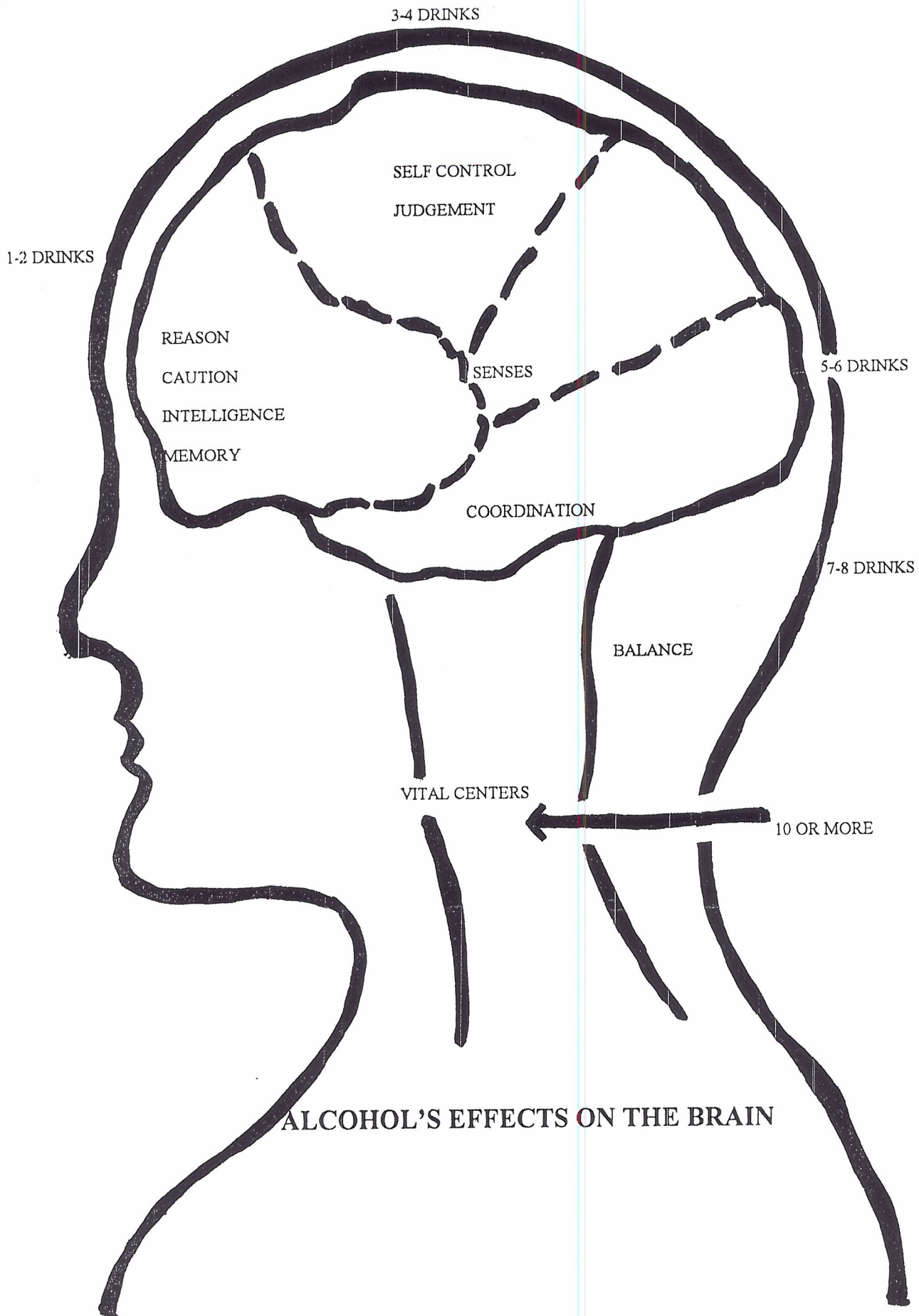
Alcohol can act as a vasodilator. This causes a relaxation of the blood vessel walls and results in more blood in the peripheral areas of the body (hands, feet, etc.). This effect is responsible for the flushed face observed in certain individuals who consume alcohol. This results in additional heat becoming lost from the human body because of the increase of blood near the body surface. Alcohol should not be given to a person suffering from exposure to cold, because this may only further lower that person's body temperature.

Alcohol is a diuretic. Alcohol depresses the release of anti-diuretic hormone that results in less water being retained in the body. This effect is best demonstrated when the alcohol concentration is rising.

STAGES OF ACUTE ALCOHOLIC INFLUENCE/INTOXICATION

| BLOOD-ALCOHOL CONCENTRATION grams/100 mL | STAGE OF ALCOHOLIC INFLUENCE | CLINICAL SIGNS/SYMPTOMS |
|---|------------------------------|---|
| 0.01-0.05 | Subclinical | Influence/effects usually not apparent or obvious Behavior nearly normal by ordinary observation Impairment detectable by special tests |
| 0.03-0.12 | Euphoria | Mild euphoria, sociability, talkativeness Increased self-confidence; decreased inhibitions Diminished attention, judgment and control Some sensory-motor impairment Slowed information processing Loss of efficiency in critical performance tests |
| 0.09-0.25 | Excitement | Emotional instability; loss of critical judgment Impairment of perception, memory and comprehension Decreased sensory response; increased reaction time Reduced visual acuity & peripheral vision; and slow glare recovery Sensory-motor incoordination; impaired balance; slurred speech; vomiting; drowsiness |
| 0.18-0.30 | Confusion | Disorientation, mental confusion; vertigo; dysphoria Exaggerated emotional states (fear, rage, grief, etc) Disturbances of vision (diplopia, etc.) and of perception of color, form, motion, dimensions Increased pain threshold Increased muscular incoordination; staggering gait; ataxia Apathy, lethargy |
| 0.25-0.40 | Stupor | General inertia; approaching loss of motor functions Markedly decreased response to stimuli Marked muscular incoordination; inability to stand or walk Vomiting; incontinence of urine and feces Impaired consciousness; sleep or stupor |
| 0.35-0.50 | Coma | Complete unconsciousness; coma; anesthesia Depressed or abolished reflexes Subnormal temperature Impairment of circulation and respiration Possible death |
| 0.45+ | Death | Death from respiratory arrest |

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ALCOHOL'S EFFECTS ON THE BRAIN



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ALCOHOL CHART FOR MALES

| Number of Drinks | | | | | | | | | | | | |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Body Weight | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 100 lb | .038 | .075 | .113 | .150 | .188 | .225 | .263 | .300 | .338 | .375 | .413 | .450 |
| 110 lb | .034 | .066 | .103 | .137 | .172 | .207 | .241 | .275 | .309 | .344 | .379 | .412 |
| 120 lb | .031 | .063 | .094 | .125 | .156 | .188 | .219 | .250 | .281 | .313 | .344 | .375 |
| 130 lb | .029 | .058 | .087 | .116 | .145 | .174 | .203 | .232 | .261 | .290 | .320 | .348 |
| 140 lb | .027 | .054 | .080 | .107 | .134 | .161 | .188 | .214 | .241 | .268 | .295 | .321 |
| 150 lb | .025 | .050 | .075 | .100 | .125 | .151 | .176 | .201 | .226 | .251 | .276 | .301 |
| 160 lb | .023 | .047 | .070 | .094 | .117 | .141 | .164 | .188 | .211 | .234 | .258 | .281 |
| 170 lb | .022 | .045 | .066 | .088 | .110 | .132 | .155 | .178 | .200 | .221 | .244 | .265 |
| 180 lb | .021 | .042 | .063 | .083 | .104 | .125 | .146 | .167 | .188 | .208 | .229 | .250 |
| 190 lb | .020 | .040 | .059 | .079 | .099 | .119 | .138 | .158 | .179 | .198 | .217 | .237 |
| 200 lb | .019 | .038 | .056 | .075 | .094 | .113 | .131 | .150 | .169 | .188 | .206 | .225 |
| 210 lb | .018 | .036 | .053 | .071 | .090 | .107 | .125 | .143 | .161 | .179 | .197 | .215 |
| 220 lb | .017 | .034 | .051 | .068 | .085 | .102 | .119 | .136 | .153 | .170 | .188 | .205 |
| 230 lb | .016 | .032 | .049 | .065 | .081 | .098 | .115 | .130 | .147 | .163 | .180 | .196 |
| 240 lb | .016 | .031 | .047 | .063 | .078 | .094 | .109 | .125 | .141 | .156 | .172 | .188 |

The above chart can be used to estimate an individual's alcohol concentration at a given time. To do this one must:

- Count the number of drinks consumed.
(1 drink = 1 ounce of 100 proof liquor = 1-12 ounce bottle of beer)
- Use the chart to determine the maximum effect for the number of drinks and body weight.
- Subtract from this number the amount of alcohol eliminated since the time of the first drink, using the average of 0.015% per hour.

Example: 180 pound man: 8 drinks in four hours

$$0.167\% \text{ minus } (0.015 \times 4) = .10\%$$

IMPORTANT!!

These calculations should only be used as a general guideline for estimating blood or breath alcohol levels. The predicted alcohol levels may not be valid for a given set of circumstances. Under these circumstances, a qualified expert should be consulted. The best method to determine alcohol concentration in an individual is by a chemical test of their breath, blood or urine.



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ALCOHOL CHART FOR FEMALES

| Body Weight | Number of Drinks | | | | | | | | | | | |
|-------------|------------------|------|------|------|------|------|------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 90 lb | .053 | .106 | .159 | .212 | .265 | .318 | .371 | .424 | .477 | .530 | .583 | .636 |
| 100 lb | .047 | .094 | .141 | .188 | .235 | .282 | .329 | .376 | .423 | .470 | .517 | .564 |
| 110 lb | .042 | .084 | .126 | .168 | .210 | .252 | .294 | .336 | .378 | .420 | .462 | .504 |
| 120 lb | .038 | .076 | .114 | .152 | .190 | .228 | .266 | .304 | .342 | .380 | .418 | .456 |
| 130 lb | .036 | .072 | .108 | .144 | .180 | .216 | .252 | .288 | .324 | .360 | .396 | .432 |
| 140 lb | .033 | .066 | .099 | .132 | .165 | .198 | .231 | .264 | .297 | .330 | .363 | .396 |
| 150 lb | .031 | .062 | .093 | .124 | .155 | .186 | .217 | .248 | .279 | .310 | .341 | .372 |
| 160 lb | .028 | .056 | .084 | .112 | .140 | .168 | .196 | .224 | .252 | .280 | .308 | .336 |
| 170 lb | .027 | .054 | .081 | .108 | .135 | .162 | .189 | .216 | .243 | .270 | .297 | .324 |
| 180 lb | .026 | .052 | .078 | .104 | .130 | .156 | .182 | .208 | .234 | .260 | .286 | .312 |
| 190 lb | .025 | .050 | .075 | .100 | .125 | .150 | .175 | .200 | .225 | .250 | .275 | .300 |
| 200 lb | .023 | .046 | .069 | .092 | .115 | .138 | .161 | .184 | .207 | .230 | .253 | .276 |
| 210 lb | .022 | .044 | .066 | .088 | .110 | .132 | .154 | .176 | .198 | .220 | .242 | .264 |

The above chart can be used to estimate an individual's alcohol concentration at a given time. To do this one must:

1. Count the number of drinks consumed.
(1 drink = 1 ounce of 100 proof liquor = 1-12 ounce bottle of beer)
2. Use the chart to determine the maximum effect for the number of drinks and body weight.
3. Subtract from this number the amount of alcohol eliminated since the time of the first drink, using the average of 0.018% per hour.

Example: 120 pound woman: 8 drinks in four hours
0.304% minus (0.018 x 4) = .23%

IMPORTANT!!

These calculations should only be used as a general guideline for estimating blood or breath alcohol levels. The predicted alcohol levels may not be valid for a given set of circumstances. Under these circumstances, a qualified expert should be consulted. The best method to determine alcohol concentration in an individual is by a chemical test of their breath, blood or urine.