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Behavioral analysis of male rat sexual motivation and performance following acute ethanol treatment

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Abstract

To characterize the effects of acute ethanol treatment on sexual motivation and performance, 30 male Long–Evans rats were assigned to one of three treatment conditions: saline ($n=9$), 0.25 g/kg ethanol ($n=10$), or 1.0 g/kg ethanol ($n=11$). Males were injected intraperitoneally 30 min before behavioral testing. Male rats were placed in a multilevel testing chamber 5 min prior to the introduction of a receptive female rat and level changes were recorded as an index of sexual motivation. After the female rat was placed in the chamber, standard measures of sexual performance were recorded over three weekly tests. Results indicated that the highest dose of ethanol (1.0 g/kg) increased male rat level-changing behavior compared to the saline group. Although ethanol treatment failed to affect most measures of sexual performance, males administered 1.0 g/kg ethanol had fewer anogenital investigations and had longer postejaculatory intervals (PEIs) compared to control animals. The data from this experiment suggest that ethanol increases rodent sexual motivation but impairs specific parameters of sexual performance.
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Keywords: Ethanol; Sexual motivation; Sexual performance; Level changes; Rat

1. Introduction

Ethanol is commonly judged to be a pharmacological agent that has a dual effect on sexual behavior. Generally, ethanol has been linked to sexual dysfunctions in humans (Malatesta et al., 1979; Mandell and Miller, 1983; Fahrner, 1987; Miller and Gold, 1988; Crowe and George, 1989). However, sexual arousal or motivation as measured by both physiological and subjective methodology appears to be enhanced by ethanol (Rockwell et al., 1973; Southwick et al., 1981; Wilson and Niaura, 1984). Some major concerns in interpreting the effect of ethanol on human sexual performance are the reliance on human populations that represent chronic disease states, such as that seen in alcoholism. Therefore, determining the precise role of ethanol on sexual performance is problematic considering that many physiological systems are altered following chronic ethanol consumption (Crowe and George, 1989; Peugh and Belenko, 2001). Furthermore, firm conclusions regarding how ethanol affects sexual motivation must be tempered because the accuracy of self-report data under the influence of psychoactive agents (including ethanol) has been shown to be problematic (Weingartner et al., 1992; Curran, 2000).

To circumvent some of the problems of delineating how ethanol affects sexual motivation and performance, controlled laboratory experiments in animals have been conducted. Gantt (1952) conducted one of the earliest experimental studies investigating the effect of ethanol on the sexual performance of laboratory animals. Using ethanol doses of 0.5, 1.0, and 2.0 g/kg, Gantt orally administered ethanol to male dogs and observed that it produced significantly longer latencies (compared to the control condition) to first erection and ejaculation in these animals. Dewsbury (1967) tested the copulatory behavior of male rats after consuming a 10% ethanol solution. Male rats that consumed ethanol had significantly longer mount, intromission, and ejaculation latencies compared to rats that consumed water. In the same study, ethanol also lengthened the mean pause between successive intromis-

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sions and extended the postejaculatory refractory period following ejaculation.

There have been a few attempts at empirically studying the effect that ethanol has on sexual motivation in laboratory animals. The difficulty in this line of research is specifying behaviors that clearly represent sexual motivation and are uncontaminated by measures of sexual performance (i.e., mounts, intromissions, and ejaculation). Therefore, it is not surprising to find that investigators have used several behavioral paradigms to quantify sexual motivation.

Pfaus and Pinel (1989) conducted two experiments that showed the inhibitory and disinhibitory effects of ethanol on male rat sexual behavior. The authors reliably showed that a range of ethanol doses (0.25, 0.5, and 1.0 g/kg ip) produced a dose-dependent disruption of male rat copulatory behavior. Moderate alterations in sexual functioning were observed at lower doses (0.25 and 0.50 g/kg), while the highest dose (1.0 g/kg) affected nearly all major dependent measures. In an additional experiment, the authors trained male rats to inhibit their sexual responses by placing them with unreceptive females for seven trials. Eventually, all males avoided copulatory attempts with the nonreceptive female. Male rats were then administered saline, 0.5, or 1.0 g/kg ethanol intraperitoneally and tested with nonreceptive female rats. The results indicated that ethanol at a dose of 0.5 g/kg increased the percentage of male rats that mounted and ejaculated with nonreceptive females. The study concluded that ethanol (at a 0.5-g/kg dose) caused disinhibition in males trained to restrain their sexual responses. That is, ethanol acted as an agent that reversed trained sexual inhibitions in rats. The authors speculated that the disinhibition observed in their study suggested that low doses of ethanol enhanced male rat sexual motivation.

Another experiment conducted by Scott et al. (1994) examined the effect that ethanol had on male rat operant responding for receptive female rats. Different groups of male rats were administered saline, 0.5, or 1.0 g/kg ethanol and then placed in a modified operant chamber. To have access to a receptive female partner, the males had to perform lever-pressing behavior to open a Plexiglas door (olfactory and visual cues of the female were available for the male through small holes in the door). Males treated with ethanol had longer latencies to emit the first response on the lever. The two doses of ethanol did not affect the response rate of lever pressing or mount and ejaculation latencies when the males gained access to the receptive female. The ability of ethanol to increase the latency to emit the first response may be due to a reduction in sexual motivation because neither response rate nor general locomotor activity was affected in the study.

One objective of the present experiment was to clarify the acute affects of ethanol on rodent sexual performance. It was hypothesized that minimal disruptions of copulation would occur at 0.25 g/kg ethanol while 1.0 g/kg would produce significant sexual alterations in male rats.

The second major impetus for this study was to assess how ethanol affected sexual motivation and whether level changes performed by male rats in a multilevel testing chamber prior to the introduction of a receptive female rat could be used as a way to quantify sexual arousal. Previous experiments (Mendelson and Pfaus, 1989) have described an increase in level-changing behavior by male rats anticipating an estrous female rat, suggesting that this is a potential method of quantifying sexual motivation. Prior to the present experiment, it was unknown whether ethanol would increase level-changing behavior beyond a control condition in male rats expecting a mating opportunity with a receptive female. It was anticipated that ethanol would increase level-changing behavior, indicating that ethanol enhances male rat sexual motivation.

2. Materials and methods

2.1. Subjects

Male Long–Evans ($n = 34$) and female Long–Evans ($n = 18$) rats were obtained from Harlan Laboratories (Indianapolis, IN). Males and females were allowed to reach sexual maturity (males: 3 months of age or 300 g, females: 3 months or 200 g) before being used in the study. All colony rooms where the animals were housed operated under a 12-h light–dark schedule (lights on at 0700 h) and ambient room temperature was maintained at 70 °F. All rats were individually housed in polypropylene shoebox cages lined with Tek-Fresh bedding. Rats were maintained on a feeding schedule (20 g of pellets/day for males, 15 g of pellets/day for females) and water was available ad libitum throughout the experiment. All animal care and experimental procedures were approved by the Institutional Animal Care and Use Committee (IACUC) at Kansas State University and were in compliance with the National Institutes of Health *Guide for the Care and Use of Laboratory Animals* (Publication No. 85-23, revised 1985).

2.2. Surgery

Female rats were bilaterally ovariectomized to allow for experimental control of sexual receptivity. The surgery was performed under anesthesia using a combination of ketamine (75 mg/kg ip) and xylazine (10 mg/kg ip). The flanks of the females were shaved and a small incision through the skin and muscle wall was made on each side of the body using a scalpel. The ovaries were externalized, removed, and the uterine horns ligated. Wounds were closed with wound clips which were removed one week following surgery. Postoperative pain was controlled with administration of buprenorphine (0.01–0.05 mg/kg sc). All ovariectomized females were allowed a 2-week postoperative recovery period prior to the start of the experiment. Females were rendered sexually receptive with injections of 3-β-

estradiol benzoate (10 μg/rat sc) 48 h and progesterone (500 μg/rat sc) 4 h before the mating sessions. Both hormones were obtained from Sigma (St. Louis, MO). The two exogenous hormones were dissolved in corn oil.

2.3. Sexual screening

All testing took place in a multilevel chamber (24 in. L × 16 in. W × 12 in. H). The chambers were obtained from Bridgeport Pets (Bremerton, WA) and were made of welded wire (0.5 × 1 in. floor spacing) with an upper shelf and ramp. Prior to sexual contact, male rats were given one habituation period (60 min in duration) to acclimate to the testing environment. During this habituation period, male rats were allowed to explore the chamber in the absence of a female rat. Female rats were also habituated using the same schedule. Following familiarization to the chambers, a single sexual screening was conducted in which males were allowed to copulate with a receptive female inside the testing chamber for 30 min. Only males that ejaculated during the sexual screening were used in the study. Four males did not mount a receptive female during the 30-min screening and were not included in the experiment.

2.4. Ethanol treatments

After the sexual screening, males were rank-ordered based on ejaculation latency (EL), matched, and distributed across three treatment conditions: saline ($n = 9$), 0.25 g/kg ethanol ($n = 10$), or 1.0 g/kg ethanol ($n = 11$). For the ethanol treatments, 95% ethyl alcohol was diluted to a 10% (v/v) stock solution and administered in the appropriate treatment doses. To control for differences in volume for the ethanol treatments, the saline group was divided so that half the animals in this group received an equivolume dose of saline corresponding to the volume needed to match the 0.25-g/kg ethanol injection, while the other half was given saline in a volume needed to match the 1.0-g/kg ethanol injection. All injections were administered intraperitoneally and given 30 min prior to testing to allow for peak blood ethanol concentrations at the start of the sexual behavior tests.

2.5. Behavioral testing and scoring

The experiment consisted of three weekly mating sessions that were each separated by 1 week. All test sessions were videotaped with JVC compact VHS camcorders and later scored by the investigator, FMF, under blind conditions. All testing was conducted during the light cycle of the day. It is suspected that only minor differences exist whether male rat sexual behavior is monitored during the light or dark cycle of the day (Agmo, 1997), although this may be strain dependent. While many investigators have chosen to test rat sexual behavior during the dark cycle, the present laboratory has consistently observed normal rat sexual functioning during the light cycle.

Male rats were placed in the testing chambers for 5 min prior to the introduction of the female rat. During this period, the number of level changes was recorded as a means to quantify the sexual motivation of the male. A level change was recorded when the male rat moved from one of the platforms of the chamber (either top or bottom), traveled either up or down the ramp, and placed all four paws on the opposite platform. After 5 min, the female was introduced into the chamber and sexual performance measurements were taken. The measures of sexual performance that were recorded included the following: mount latency (ML), time from the introduction of the female to the first mount; mount frequency (MF), the number of mounts prior to ejaculation; intromission latency (IL), time from the first mount until the first intromission; intromission frequency (IF), the number of intromissions prior to ejaculation; EL, the time from the first intromission until ejaculation; and the postejaculatory interval (PEI), time from the first ejaculation until the male achieved an intromission during the second copulatory series. During the PEI, the latency and frequency of solicitation behaviors made by female rats toward males were recorded. Solicitation behavior was quantified as an approach by a female rat toward the male followed by the female displaying proceptive actions, such as hopping, darting, and presentation behavior. Bouts of anogenital investigation (a male rat sniffing the anal and vaginal area of a receptive female) were recorded from the time when the female entered the chamber until the male ejaculated. Because anogenital sniffing is a behavior often seen during rodent copulation and can be easily quantified, bouts by male rats were recorded throughout the mating trials.

Once the female was introduced, the mating session lasted for 30 min or until a PEI was achieved. Once the male successfully intromitted after an ejaculation, an observer removed the male from the cage to avoid further sexual practice that a male may gain while remaining with a receptive female. The aforementioned criteria for measuring male rat sexual behavior are in concert with the standards described by Meisel and Sachs (1994).

2.6. Interobserver reliability

An independent research assistant scored a series of randomly selected mating trials from the experiment as a way to assess interrater reliability. The scoring of the assistant correlated highly ($r > .90$) with that of FMF across all dependent measures recorded in the study.

2.7. Statistical analysis

Data obtained on measures of sexual motivation and performance were analyzed with individual 3 × 3 (Treatment × Test) mixed analyses of variance (ANOVAs) with repeated measures on the final factor. The treatment factor represented a between-group variable; animals either received saline, 0.25, or 1.0 g/kg ethanol. The three weekly

mating tests represented a within-subject factor. The level of statistical significance for all analyses was set at $P < .05$. Significant main effects were further analyzed with a Dunnett post hoc test as described by Keppel (1991). All analyses were conducted using SPSS 11.0 for Windows®.

3. Results

3.1. Sexual motivation

Fig. 1 shows the mean number of level changes performed by male rats in all treatment conditions across three weekly tests. It is important to note that prior to drug administration (baseline), males in all treatment conditions made comparable level changes 5 min before the introduction of a receptive female rat. During drug administration, statistical analyses revealed a significant test effect, $F(2,54) = 4.49$, $P = .02$, indicating that male rats in all three treatment conditions increased level changes across the weekly testing sessions. Furthermore, a significant treatment effect was found, $F(2,27) = 3.65$, $P = .04$. A Dunnett post hoc analysis revealed that male rats treated with 1.0 g/kg ethanol made significantly more level changes compared to rats given saline injections ($P = .03$). There was no significant difference in level-changing behavior between the 0.25-g/kg ethanol and saline groups. The Treatment × Test interaction was not statistically significant.

It is possible that the level-changing behavior of the males was altered independently of ethanol treatment considering that on each test day, the first group of males entered the chamber without an estrous female present in the previous session. One may speculate that males tested first would have reduced level-changing behavior due to the absence of estrous olfactory cues. Conversely, males that were tested during later sessions may have had the benefit of an elevated amount of estrous cues (although all chambers were cleaned with deionized water between sessions) from previous females and thus performed more level changes during the 5-min testing period. Statistical analysis (conducted using a 3 × 3 ANOVA, Running Session × Test Day) indicated that there were no significant differences in level-changing behavior by male rats across different testing sessions, $F(2,24) = 2.54$, $P = .10$.

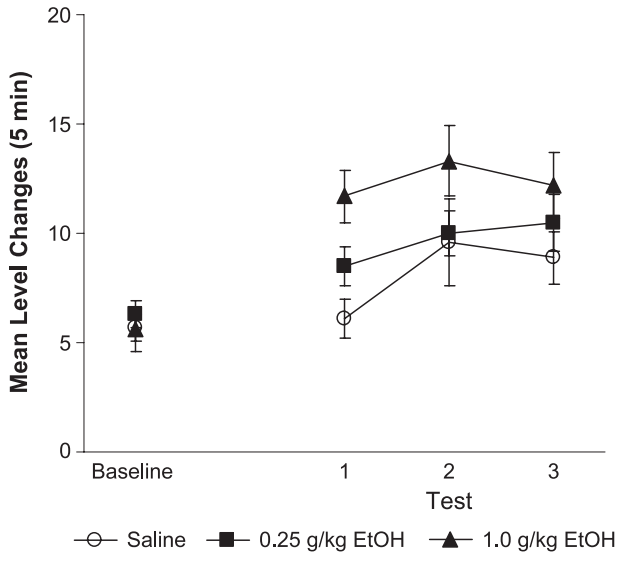

Fig. 1. Level changes performed by male rats 5 min prior to the introduction of a receptive female rat across three weekly tests. Male rats were intraperitoneally injected with saline ($n = 9$), 0.25 g/kg ethanol ($n = 10$), or 1.0 g/kg ethanol ($n = 11$) 30 min before being placed in the chamber. Data represent group means ± S.E.M.

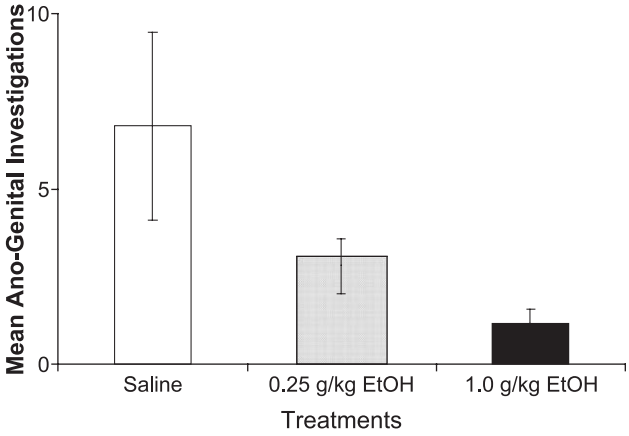

Fig. 2. Anogenital investigations in male rats injected with saline ($n = 9$), 0.25 g/kg ethanol ($n = 10$), or 1.0 g/kg ethanol ($n = 11$). Anogenital investigations were recorded from the introduction of the female rat until the male ejaculated. Because test day did not interact significantly with treatment group, data are presented as group means ± S.E.M. collapsed across three weekly tests.

3.2. Sexual performance

One rat from the 1.0-g/kg ethanol group was not included in any of the sexual performance analyses due to the absence of sexual activity observed during the three tests.

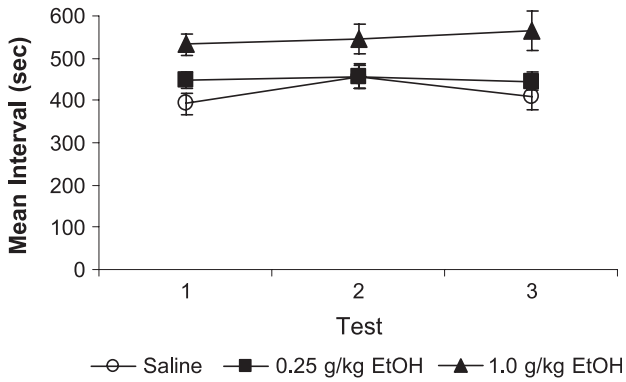

Fig. 3. Mean (± S.E.M) PEI of male rats injected with saline ($n = 9$), 0.25 g/kg ethanol ($n = 10$), or 1.0 g/kg ethanol ($n = 10$) across three weekly tests. The PEI was recorded from the time the male ejaculated until an intromission was performed.

Acute ethanol injections significantly altered two sexual performance parameters. First, an overall treatment effect was discovered in the analysis of the male investigations of the anogenital region of a receptive female rat, $F(2,26) = 4.21$, $P = .03$ (Fig. 2). A post hoc Dunnett test confirmed that male rats administered 1.0 g/kg ethanol performed significantly fewer anogenital sniffs compared to saline-treated animals ($P = .02$). The second major sexual performance measure impaired in male rats given ethanol was the length of time it took males to perform an intromission following an ejaculation, referred to as the PEI (Fig. 3). The percentage of trials in which males ejaculated during the three tests was 80/87 = 91%. Seven rats did not ejaculate during various test days (saline, $n = 3$; 0.25 g/kg EtOH, $n = 1$; 1.0 g/kg EtOH, $n = 3$). In all cases, these males had data missing from only one test. Due to the random occurrence of nonejaculatory behavior, a mean substitution was used where the average PEI from two completed tests determined the PEI for the missing data cell. A significant treatment difference was observed, $F(2,26) = 6.31$, $P = .01$; post hoc analysis indicated that males given 1.0 g/kg ethanol had significantly longer PEIs compared to rats administered saline ($P = .01$).

It is conceivable that the increase in the PEI in males given 1.0 g/kg ethanol could be attributed to changes in solicitation behavior of the female toward the male. To address this possibility, the latency and frequency of female rat solicitation behaviors toward males in the 1.0-g/kg ethanol and saline group were quantified during the PEI. Analyses conducted showed that there were no significant differences in the latency ($P = .92$) or frequency ($P = .09$) of sexual solicitations by female rats toward males in the 1.0-g/kg ethanol and saline groups.

Although additional sexual performance measures were recorded, there were no significant treatment differences found with the statistical analysis (Table 1).

Table 1
Sexual performance parameters recorded from male rats (group differences were not statistically significant)

Group	ML	MF	IL	IF	EL
Test 1					
Saline	6.1 ± 1.1	14.7 ± 1.6	42.3 ± 22.8	6.8 ± 1.1	284.6 ± 39.5
0.25 g/kg EtOH	6.6 ± 1.7	13.7 ± 2.3	37.5 ± 16.0	7.0 ± 0.4	279.3 ± 39.2
1.0 g/kg EtOH	7.5 ± 0.5	19.5 ± 3.4	50.7 ± 19.3	6.2 ± 0.4	341.7 ± 46.1
Test 2					
Saline	5.3 ± 0.7	18.9 ± 3.2	48.4 ± 28.4	5.8 ± 0.5	268.3 ± 49.5
0.25 g/kg EtOH	4.6 ± 0.5	17.0 ± 1.8	97.4 ± 31.6	5.8 ± 0.6	275.6 ± 40.6
1.0 g/kg EtOH	6.0 ± 0.5	20.6 ± 1.9	79.9 ± 31.0	4.3 ± 0.6	318.2 ± 53.6
Test 3					
Saline	5.0 ± 0.5	20.1 ± 3.0	90.0 ± 49.5	5.9 ± 0.7	403.3 ± 135.5
0.25 g/kg EtOH	5.2 ± 1.1	14.9 ± 1.7	26.2 ± 13.6	6.6 ± 0.6	230.5 ± 30.8
1.0 g/kg EtOH	4.6 ± 0.5	16.6 ± 1.9	28.7 ± 10.7	5.7 ± 0.5	282.0 ± 59.2

Data are group means in seconds ± S.E.M.
Heading key: ML (mount latency), MF (mount frequency), IL (intromission latency), IF (intromission frequency), EL (ejaculation latency).

4. Discussion

Male rats given acute injections of 1.0 g/kg ethanol showed a reliable increase in the number of level changes performed in a multilevel testing chamber 5 min prior to the entrance of a receptive female rat compared to male rats given saline injections. Although previous investigators have reported that level-changing behavior reflects rodent sexual motivation (Mendelson and Gorzalka, 1987; Mendelson and Pfaus, 1989), this study contributes the first empirical findings suggesting that ethanol is capable of increasing such behavior. Ethanol did not increase level-changing behavior due to persistent olfactory cues available from previously tested estrous females, as there was no significant session effect discovered in the data. The significant increase in level changes performed by the 1.0-g/kg ethanol group might be argued to be a general locomotor enhancement considering certain doses of ethanol are motor stimulants in mice (Masur and dos Santos, 1988). However, data from our experiment indicate that male rats given injections of 1.0 g/kg ethanol had no significant differences in mount, intromission, or ejaculation latencies compared to saline animals, which counters claims that ethanol produced nonspecific motor activation. Furthermore, several investigators have failed to find an increase in general locomotor activity in male rats following an intraperitoneal injection of 1.0 g/kg ethanol (Scott et al., 1994; Frye and Breese, 1981).

Although the testing chambers used in this experiment differed slightly in construction compared to the bilevel chambers described by Mendelson and Pfaus (1989), an important commonality exists between the present experiment and the previous literature: level-changing behavior represents a valid way to quantify rodent sexual motivation. The significant increase in level-changing behavior by animals in all treatment groups across the weekly test days is argued to be a conditioned response by male rats anticipating a sexually receptive female partner. The search-like behavior that males engage in while level changing represents an ecologically valid assessment of motivation in that rodents in the natural environment search for receptive mates by investigating multilevel burrows (Robitaille and Bovet, 1976).

In contrast to the enhancing effects of ethanol on rodent sexual motivation, the present experiment found that a 1.0-g/kg dose of ethanol impaired two major sexual performance measurements. Ethanol reduced the bouts of anogenital investigations made by male rats. This reduction represents a clear alteration in the normal pattern of copulatory activity because saline-treated males spent time

sniffing the female's anus and genital region to gain olfactory cues elucidating the estrous state of the female. There is debate whether anogenital investigations are best categorized as performance or motivation indices. More than likely, this behavior is a complex combination of motivation and performance factors that may not be easily isolated by behavioral observations alone. Some recent reports indicate that human alcoholics not experiencing major memory deficits (i.e., Korsakoff's Syndrome) have reduced olfactory functioning (Rupp et al., 2003). Binge ethanol treatments (16 treatments in 4 days) in both juvenile and adult rats have been known to cause cellular damage in the olfactory bulb (Crews et al., 2000), which would dampen the ability to detect olfactory cues in general. Although our dosing regimen was in three acute sessions, an additional exploration of whether ethanol alters general olfactory functioning would aid in assessing the specificity of the effect.

One of the most consistent findings in the present experiment was the increase in the PEI by male rats administered 1.0 g/kg ethanol. The increase in the PEI was moderate (an average of 125.5 s difference between the 1.0-g/kg EtOH and the saline animals collapsed across three tests) but reliably observed on three weekly tests. The increase in the PEI by ethanol-treated rats was not due to adverse or rebuffing reactions of female rats toward males following ejaculation. The latency and frequency of female rat sexual solicitation behaviors (i.e., hopping and darting behavior) were not statistically different between males given 1.0 g/kg ethanol or saline. Thus, the increase in the PEI was a pharmacological effect and not one that was mediated by the social behavior of the female.

The present experiment attempted to provide clarification regarding the effects of ethanol on male rat sexual performance. The trend from previous studies involving rats suggested that low doses of ethanol produced minor impairments of sexual performance, while high doses resulted in more extensive alterations, such as longer mount, intromission, and ejaculation latencies. The lowest dose tested in this experiment (0.25 g/kg) did not cause changes in any of the sexual performance parameters when compared to the saline group which is consistent with the minimal alterations found with Pfaus and Pinel (1989). In the present experiment, acute ethanol injections at the highest dose tested (1.0 g/kg) affected a narrow spectrum of copulatory behaviors and did not cause major disruptions in sexual performance as mentioned in Pfaus and Pinel (1989).

Therefore, it is important to address the fact that many of the sexual performance measures were unaffected by acute ethanol injections. It is conceivable that ethanol may have a more profound effect on rodent copulatory performance if the time between injection and test is shortened. In this experiment, males were tested 35 min postinjection. One shortcoming of this study is that blood ethanol levels were not measured as a way to confirm peak ethanol levels in our rats. Lewis and June (1990) showed rat blood ethanol levels peak at 20 min postinjection. Therefore, while we report significant effects of ethanol on certain aspects of male sexual performance at 35 min postinjection, a more robust alteration of copulation may be seen at earlier testing times.

Additional factors that may have contributed to differences between the present data and previous experiments may reside in the amount of male sexual experience (1 sexual screening used here, while Pfaus and Pinel (1989) report 10 baseline screenings). Sexual experience may be predicted to buffer male rats from the sexual-impairing effects of ethanol; however, this relationship is not entirely perfect in that the same dose of ethanol affected only a limited number of sexual performance measures in the present experiment, yet several in Pfaus and Pinel (1989). Testing chamber differences may also be important (multilevel vs. unilevel) in that males may have to pursue females longer when placed in a multilevel chamber, potentially masking the effect of ethanol on sexual latency data.

The present behavioral paradigm has utility in exploring the pharmacological effects of ethanol on rodent sexual motivation and performance. Certain neurotransmitters, such as the endogenous opioids have been suggested to enhance sexual motivation while hindering sexual performance (Van Furth et al., 1994). Furthermore, a recent microdialysis experiment showed that acute intraperitoneal administration of ethanol causes the central release of beta-endorphins in rats (Olive et al., 2001). Therefore, one obvious avenue to investigate is whether an opioid antagonist can reverse ethanol-induced alterations in sexual motivation and performance observed in this experiment.

Additional experiments that would logically follow the present report would be exploration of brain areas critically involved in ethanol-induced changes in male rat sexual performance. Evidence points to the medial preoptic area (mPOA) as an influential neural structure involved in copulatory actions (Malsbury, 1971). A recent microstructure analysis in Japanese quail discovered that lesions to specific subregions of the mPOA impaired sexual performance behaviors while leaving sexual appetitive behaviors relatively intact (Balthazart et al., 1998). These data suggest that particular areas of the mPOA are localized for sexual performance and may be the neural region in rats where ethanol is producing its copulatory deficits.

The study described in this report has provided a controlled exploration of the acute effects of ethanol on male rodent sexual motivation and performance. It does appear that these two sexual constructs are dissociable in that it was reported that ethanol increased level-changing behavior (increased motivation) but impaired the PEI (decreased performance). The paradigm described here has the potential to elucidate the neuroanatomical structures and neurochemical mechanisms involved in ethanol-induced changes of sexual motivation and performance. By doing so, researchers can expect a clearer understanding of how ethanol alters sexual behavior and applications may be made to human populations that use and abuse ethanol.

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