Human social attitudes affected by androstenol

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Human social attitudes affected by androstenol

Kirk-Smith, M.D., Booth, D.A., Carroll, D., and Davies, P.

University of Birmingham

Abstract

This experiment is the first clear characterisation of an effect of a naturally secreted pure odour on measurements of sexual and agonistic relations among human subjects.

INTRODUCTION

The boar pheromone androst-16-en-3-ol is suited to investigating the possibility of olfactory social communication between human beings. Androstenol is of adrenal origin, is excreted in urine and male axillary sweat and has no known physiological function (Brooksbank et al., 1974). Male and female axillary odours can be discriminated, in part apparently by a "musky" odour of the male sweat (Russell, 1976). Androstenol has musky or urinous odours and is more readily detected by women than men (Koelega and Koster, 1974). Both androstenol and also a fatty acid mixture similar to that found in human vaginal secretions can affect people's judgments of written descriptions of others (Cowley et al., 1977), although it was unclear which aspects of the judgments were changed. We have confirmed and extended these findings using judgments of photographs, identifying specific changes in the presence of androstenol in both mood and attitudes to others.

METHOD

Twelve male and 12 female undergraduates were paid to attend individually for two sessions approximately one week apart in a quiet, well-ventilated cubicle. The students were told that the experiment was to test the effect of the mild stress of wearing a surgical mask and possibly surgical gloves (the gloves were in fact never used) on attitudes to other people. For half the men and half the women, the mask was impregnated in the first session with 0.3 mg of androstenol (pure by GLC and MP: B.W.L. Brooksbank, personal communication) dissolved at 1 mg/ml in spectroscopic ethanol. During their second session the mask was clean. The other half of the subjects had the impregnated mask during their second session.

While the masks were worn during each session, 16 photographs of normally clothed people, four photographs of animals and four of buildings were presented in counter-balanced sequences. The subjects rated each photograph on 15 nine-point bipolar category scales derived from the semantic differential of Osgood et al. (1957). The scale terms were: insensitive-sensitive, unconfident-confident, bad-good, unattractive-attractive, cold-warm, rash-cautious, masculinity-femininity, unintelligent-intelligent, aggressive-defensive, boring-interesting, unsexy-sexy, soft-hard, unemotional-emotional, passive-active and unfriendly-friendly. In addition, eighteen 100-mm visual analogue scales of mood (Bond and Lader, 1974) were completed with the mask on,
before and after rating the photographs. At the end of each session the subject was asked to record whether he or she noted anything unusual in the experimental conditions.

After the second session, the subjects wrote their views on the purpose of the experiment. No subject stated this correctly, although one man and two women reported noticing the odour of the mask and one woman remarked on a 'garlicky' smell when she put on her androstenol mask.

Subjects were then screened for anosmia to androstenol (Amoore et al., 1977). Two sets of three masks were presented, with the second of the first set and the first of the second set impregnated with 0.3 mg of androstenol as during one of the main sessions. One man failed to identify the odorised masks correctly. His data and those of the woman who was tested with the same sequence of the photographs were excluded from the analysis.

RESULTS

Comparison of the means by analysis of variance (Table 1) showed that in the presence of androstenol the whole group of subjects rated the photographed women as sexier, more attractive and better. (The latter two effects also appeared in a comparison of the androstenol and control conditions between subjects in their first session only: thus, the attractiveness did not depend on contrast in mask odour between sessions.) Also, both sexes breathing androstenol rated photographed women and men warmer (Table 1) and rated some of these photographs friendlier than others. Women judged photographed people overall to be more defensive (Table 1): this effect was confined to the initial half of the androstenol session, whereas men judged the photographed women to be more aggressive in the final half. There was also a tendency for all human photographs to be judged more interesting in the presence of androstenol. Such effects were not seen with the animal or building photographs, although animals were judged rashier and buildings less sensitive.

The pattern of changes in the ratings of the human photographs, which was caused by androstenol, was assessed by a quartimax factor analysis of responses to the terms warm, friendly, good and sensitive loaded most heavily (0.64) on the first factor extracted (30 of variance), while sexy, intelligent and attractive were most heavily loaded on a second factor (16%). Aggressive-defensive loaded highly (0.64) with active-passive (0.76) on a third factor (10%). Thus the steroid may have effects on specifically sexual and aggressive attitudes as well as on a more general friendliness. A similar factor structure was seen on analysis of the ratings made while wearing the clean mask, except that the first two factors were collapsed into a single factor accounting for 34 of the variance, and the aggression factor (18%) had hard-soft highly loaded on it instead of active-passive.

The scores on the mood scales were logistically transformed to allow for end effects and subjected to analysis of variance (Table 1). In the presence of androstenol the subjects' mood was more friendly and elated at the start of the session than at the end.

DISCUSSION

We conclude that androstenol made the photographed women appear sexually more attractive in the judgment of both men and women, with a conceptually related and weaker effect on
judgments about the photographed men. Factorially distinct judgments of aggressive-defensiveness showed an effect of androstenol specific to the sex of the subject. Androstenol appears to make boars more aggressive (T.R. Auchinloss, personal communication) and to immobilise the sow in a mating stance (Melrose et al., 1974). Comfort (1971) has suggested that androstenol is a vestigial territorial pheromone in man. He also implied that such releaser functions were innate. Alternatively, some or all of the effects we observed could be attributed to conditioning of the odour in the sexual or other social situations where musk-containing perfumed products are in frequent use (Doty et al., 1976).

Acknowledgment: We thank Dr. B.W.L. Brooksbank for the gift of androstenol.

REFERENCES


Table 1: Mean Rating Scores in the Presence or Absence of Androstenol.

<table>
<thead>
<tr>
<th>Personality Ratings</th>
<th>Sex of Photographs Rated</th>
<th>Androstenol Present</th>
<th>Androstenol Absent</th>
<th>SE Mean</th>
<th>p Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexy-Unsexy</td>
<td>Male</td>
<td>-0.64</td>
<td>-0.42</td>
<td>0.09</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.47 **</td>
<td>0.07</td>
<td></td>
<td></td>
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<tr>
<td>Attractive-Unattractive</td>
<td>Male</td>
<td>0.20</td>
<td>0.15</td>
<td>0.08</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.01 **</td>
<td>0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good-bad(^1)</td>
<td>Male</td>
<td>0.37</td>
<td>0.46</td>
<td>0.07</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.13 **</td>
<td>0.86</td>
<td></td>
<td></td>
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<tr>
<td>Warm-Cold(^1)</td>
<td>Both Sexes</td>
<td>0.70</td>
<td>0.44</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

**Sex of Rater**

| Aggressive-Defensive | Male                     | -0.08               | -0.03              | 0.07    | <0.05         |
|                      | Female                   | 0.24 **             | -0.06              |         |               |

**Mood Ratings**

<table>
<thead>
<tr>
<th>Friendly-Antagonistic</th>
<th>Stage of Session</th>
<th>Rating Term</th>
<th>SE Mean</th>
<th>p Interaction</th>
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</thead>
<tbody>
<tr>
<td>Start</td>
<td>0.40</td>
<td>0.36</td>
<td>0.03</td>
<td>&lt;0.05</td>
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<td></td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finish</td>
<td>0.21 *</td>
<td>0.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elated-Depressed</td>
<td>Start</td>
<td>0.15 *</td>
<td>0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Finish</td>
<td>0.00</td>
<td>0.03</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

**Note:** Rating terms are listed with the positive-scored term on the left. Asterisks are placed between means which differ significantly by Duncan's multiple range test: *\(p < 0.05\), **\(p < 0.01\).

1. Androstenol effect significant over the whole group (\(p<0.05\)).