Does the menstrual cycle modulate how trustworthy a woman sounds? Evidence from sighted and blind participants

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Research Questions

- Does the menstrual cycle phase affect the perceived attractiveness and trustworthiness of women's voices?
- If so, are blind individuals more sensitive to cycle-dependent changes in women's voices than normally sighted individuals?

Conclusions

- Sighted and blind individuals do not differ in sensitivity to subtle changes in women's voices
- We found that women's voices sound more trustworthy around ovulation and more attractive in the luteal phase

Introduction

- Many studies suggest that women's voices sound more attractive during the fertile phase of their menstrual cycle[1,2,3]
- Blind individuals have been found to possess superior voice processing capabilities due to neuronal plasticity[4]
- Here we tested whether blind individuals are more sensitive than sighted individuals and whether speech content plays a role

Method

- The voice of 20 female speakers (M = 22.7 years, SD = 2.3; non-smokers, regular menstrual cycle, no hormonal contraception, no pregnancy, no breastfeeding) was recorded when speaking different sentences around ovulation and in the luteal phase
- Three sentences were of neutral content and three sentences suggested an affiliation context in which you want get to know someone
- Ovulation was determined by means of LH ovulation tests and the cycle phases were confirmed by means of hormone analysis from saliva[5]

- For each speaker, voice recordings of both cycle phases were paired
- 60 sighted raters (30 women, M = 27.3 years, SD = 11.6) were asked to choose the voice sample of each pair that sounded more trustworthy (Block 1) or more attractive (Block 2) in a two-alternative forced choice paradigm
- 23 blind raters (visual acuity less than 0.1; 15 women, M = 53.0 years, SD = 15.0) were given the same task

- All participants reported to have no hearing problems
- In addition to the perceptual ratings, voice recordings were analysed acoustically using Praat software[6]

Results

- A 2 (task) × 2 (sentence content) ANOVA with "vision" and "rater's sex" as between-subjects factors revealed a significant effect of "task" ($F_{(1,79)}$ = 26.980, p < .001, η_p^2 = .26), an effect of "sentence content" ($F_{(1,79)}$ = 16.277, p < .001, η_p^2 = .17), a significant "sentence content × vision" interaction ($F_{(1,79)}$ = 4.763, p = .032, η_p^2 = .06), and a "task × sentence content" interaction ($F_{(1,79)}$ = 25.946, p < .001, η_p^2 = .25)
- The factors "vision" (p = .57) and "rater's sex" (p = .56) were not significant
- "Task": In the trustworthiness rating, ovulatory voices were preferred as sounding **more trustworthy** (M = .53, SE = .006); in the attractiveness rating, voices in the luteal phase were preferred as sounding **more attractive** (M = .47, SE = .01)
- "Sentence content": In sentences with affiliation context, voices in the luteal phase were preferred (M = .48, SE = .008); in neutral sentences, ovulatory voices were preferred (M = .52, SE = .008)
- "Sentence content × vision" interaction: Blind individuals more often chose luteal phase voices in sentences with affiliation context (M = .47, SD = .05, $t_{(22)}$ = - 3.215, p = .004, r = .57) and ovulatory voices in sentences with neutral content (M = .54, SD = .06, $t_{(22)}$ = 2.977, p = .007, r = .54); in sighted individuals there was no such effect (both p's > .15)
- "Task × sentence content" interaction: In the trustworthiness rating, **ovulatory voices** were perceived as being **more trustworthy** irrespective of sentence content (affiliation sentences M = .54, SD = .07, $t_{(82)}$ = 5.477, p < .001, r = .52; neutral sentences M = .52, SD = .07, $t_{(82)}$ = 3.373, p = .001, r = .35); in the attractiveness rating, voices in the **luteal phase** were perceived as being **more attractive**, but only in sentences with affiliation context (affiliation sentences M = .42, SD = .11, $t_{(82)}$ = - 6.557, p < .001, r = .59; neutral sentences p = .52)

- Phonetic analysis revealed no cycle-dependent differences

Discussion

- Women might express increased affiliation motivation[7] during the luteal phase in their voices, but only in sentences with social content
- Speech content is relevant when assessing the attractiveness of women's voices
- Raters seem to be more sensitive than phonetic software
- Limitations: Different sample sizes, age differences, sex ratio not well-balanced in blind sample
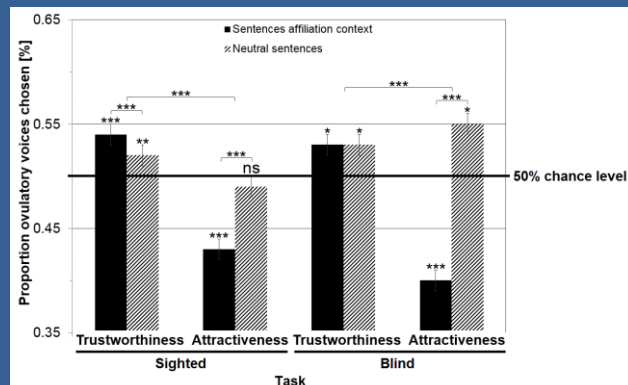
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