

From the Institut für Biologie I, Albert-Ludwigs-Universität Freiburg

Vigilance and Group Size in *Homo sapiens*

PETER WIRTZ & MONIKA WAWRA

With 2 figures

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Abstract

While eating, *Homo sapiens* frequently look up and visually scan their environment. As in many bird and mammal species studied, the frequency of looking up was negatively correlated with group size. Average duration of scanning the environment also correlated negatively with group size. At all group sizes studied (1—5), females spent less time scanning than did males. With increasing group size females reduced their rate of looking up more than did males.

Introduction

For a number of mammal and bird species it has now been shown that with increasing group size the individual reduces its rate and/or duration of scanning the environment (e.g. POWELL 1974; BERGER 1978; HOOGLAND 1979; CARACO 1979; SIEGFRIED 1980; BERTRAM 1980; INGLIS & LAZARUS 1981; UNDERWOOD 1982; CRIEBER & BARRETTE 1984; METCALFE 1984). One of the methods of the study of human behaviour (human ethology) is to search whether rules found to apply to many animal species do also apply to *Homo sapiens* (DARWIN 1872; EIBL-EIBESFELDT & HASS 1966). We here show that in people eating in a students' refectory both the rate and duration of scanning behaviour of individuals was negatively correlated with group size.

Methods

Observations were made at lunch time in two of the students' refectories of Freiburg university. From the upper level the observer looked down into the lower level dining hall and recorded observations on a tape recorder. The key variables noted were: number of people eating at a table, sex

of person recorded, and beginning and end of the periods during which this person looked up from eating, apparently scanning the environment. Looking directly at another person at the same table was not counted as scanning behaviour. From such records of between 2 and 10 min length the frequency of looking up per min and the duration of looking up per min were calculated for each person. We recorded the behaviour of 160 singletons, 244 persons at group size two, 153 persons at group size three, 168 persons at group size four, and 96 persons at group size five ($N = 821$).

Results

Fig. 1 shows the frequencies of looking up: group size and average frequency of looking up were negatively correlated. The mean frequency of looking up at group size one was almost twice the mean recorded at group size five (4.17 versus 2.26). The differences between all groups are statistically significant at $p < 0.01$ or less (t-tests).

Not only the frequency but also the duration of looking up was negatively correlated with group size (Fig. 2): singletons on average spent 16.8 s per min scanning their environment, while persons in groups of five spent only 2.9 s per min scanning. Again, the differences between all groups are statistically significant at $p < 0.05$ or less (t-tests on log transformed data). Average bout length of scanning (duration divided by frequency) declined from 4.03 s at group size one to 1.28 s at group size five. Thus, the decline in time spent scanning was due to a decrease in both the rate of scanning and in average bout length.

There were sex differences in the frequency and in the duration of looking up. At all group sizes females spent on average less time scanning than did males: Table 1. This difference is significant with $p < 0.05$ only at group size two, but the trend is the same at all group sizes ($p \leq 0.10$, sign test). The average frequency

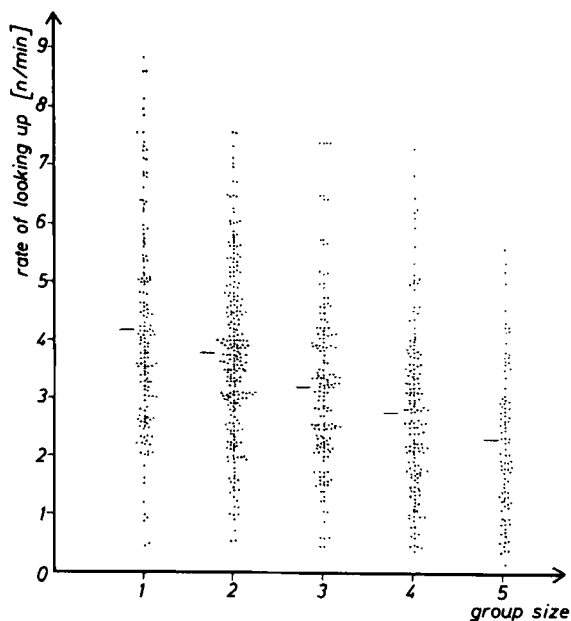
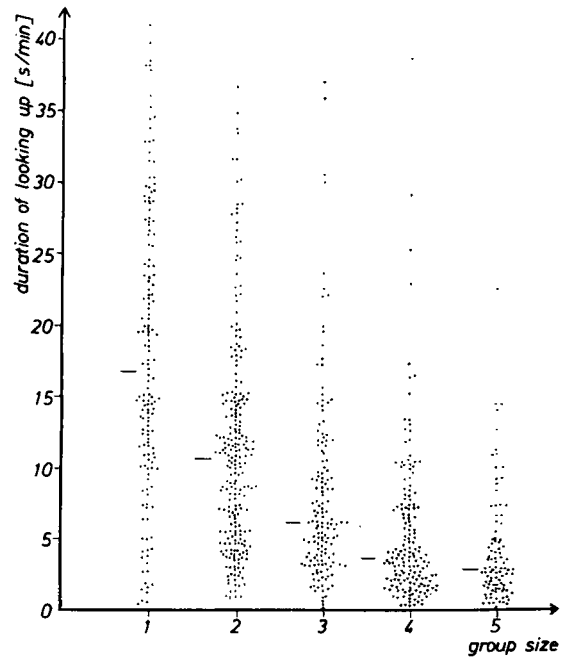


Fig. 1. Frequency of looking up when in groups of different sizes. Mean values indicated

Fig. 2: Duration of looking up when in groups of different sizes. Median values indicated



of looking up was higher for females at group sizes one and two, higher for males at group sizes three to five: Table 1. Apparently females reduced their rate of looking up more with increasing group size than did males ($p < 0.001$, comparison of regression coefficients by analysis of covariance).

Table 1: Average durations, rates, and bout lengths of looking up classified according to sex and group size

Measure	Sex	Group Size				
		1	2	3	4	5
Duration (= median s looking up per min)	Female	16.5	9.0	5.8	3.6	2.0
	Male	17.8	11.8	6.7	3.7	3.0
Rate (= mean frequency of looking up per min)	Female	4.38	3.82	3.02	2.57	1.95
	Male	4.03	3.67	3.29	2.82	2.42
Average bout length of looking up (= duration divided by rate)	Female	3.77	2.36	1.92	1.40	1.03
	Male	4.42	3.22	2.04	1.31	1.24

Discussion

A sex difference in the frequency of scanning the environment was also found in chimpanzees: while opening and eating nuts males look around more frequently than females (BOESCH & BOESCH 1984).

For animals the term vigilance is frequently used when describing scanning behaviour and the assumed function is the detection of predators. Provided that the members of a group can make use of the vigilance of their companions, an animal feeding in a group can reduce its own periods of vigilance and so spend a greater proportion of time for other activities, without a decrease in the protection against predation. Scanning behaviour of *Homo sapiens* has been interpreted as a behavioural relic from the time when man suffered predation from animals (HASS 1968; BARASH 1972). The notion that scanning behaviour should probably be seen in a motivational context of the feelings of fear and insecurity is indicated by observations of BARASH (1972): solitary individuals prefer sitting adjacent to a wall over a central position and solitary individuals sitting in a central position look up more frequently than those sitting adjacent to a wall. It seems likely that a subconscious feeling of insecurity leads to a higher rate and duration of scanning the environment. However, our results that both the rate and duration of scanning behaviour are negatively correlated with group size are not necessarily due to a greater feeling of security of people in groups (even though we tend to favour this hypothesis). At present, other interpretations cannot be rigorously excluded. Such other interpretations are, for instance: With increasing group size more time is spent in interaction with group members and therefore less time and opportunity remains for scanning the environment, or, the smaller the group the more an individual is in search of social contact and therefore scanning the environment more frequently and longer.

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Authors' address: P. WIRTZ, Institut für Biologie I, Albert-Ludwigs-Universität, Albertstraße 21 a, D-7800 Freiburg i. Br. M. WAWRA, Forschungsstelle für Humanethologie, Max Planck Institut, D-8131 Seewiesen.