

EFFECT OF A CONSPECIFIC ON NEST BUILDING LOCATION IN THE ZEBRA FINCH

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DURING a series of experiments to test effects of social stimuli on nest building in male gray Zebra Finches (*Poephila guttata*), the subjects were allowed to choose between two types of receptacle for nest building. Sargent (1965) has shown that in Zebra Finches rearing experience, and especially previous nesting experience, influences preference for nest substrate type and type of "habitat" in which to build. As we did not know the previous experience of our stock (imported from Europe), we provided each male with both an open and a domed nest receptacle. One receptacle was always nearer a conspecific (confined to an adjacent compartment) than was the other. Furthermore the positions of the two receptacles were alternated between successive experimental replicates. This afforded an opportunity not only to investigate preference for receptacle type, but also to examine the influence of proximity to a conspecific on this preference.

METHODS

Experiments were conducted from May 1967 to January 1969 on 69 male Zebra Finches in order to measure certain parameters of nest building. The experimental cage (Figure 1) consisted of two compartments. Each subject was placed alone in the larger compartment (46 cm long, 61 cm high, and 30 cm wide) and a stimulus bird (conspecific male or female) was placed in the smaller one (20 cm long, 61 cm high, and 30 cm wide). An aluminum hopper in the cage door held 400 brown burlap strands 15 cm long for nesting material. Between 11:30 and 12:30 daily during the 6½ day experimental period the cages were serviced, all strands were removed from the cages, including those in nest receptacles, and the hopper was replenished with 400 unused strands. Each male was provided with two nest receptacles, an open wicker cup (6 cm × 12 cm) and a domed wicker basket (10 cm × 12 cm) with a side entrance (4 cm diameter). One receptacle was hung near the stimulus bird's compartment, the other at the same height (about 52 cm from the top of the receptacle to the floor) at the opposite end of the cage. The receptacles were about 15 cm apart at their nearest edges.

The criterion for building was met when five or more strands were placed in a nest receptacle in one day. This criterion is arbitrary, but was set in an attempt to eliminate possible chance dropping of strands in a nest receptacle from the category of nest building.

A transparent plexiglass partition separated 35 males individually from a male or female in their cage that they could see and hear. An opaque Masonite partition separated 25 males from a conspecific that could be heard but not seen. The remaining 9 males were isolated from the sight and sound of any other birds. Each bird was used in only one experiment or replicate.

The building sites are abbreviated C for in the cup receptacle, D for in the

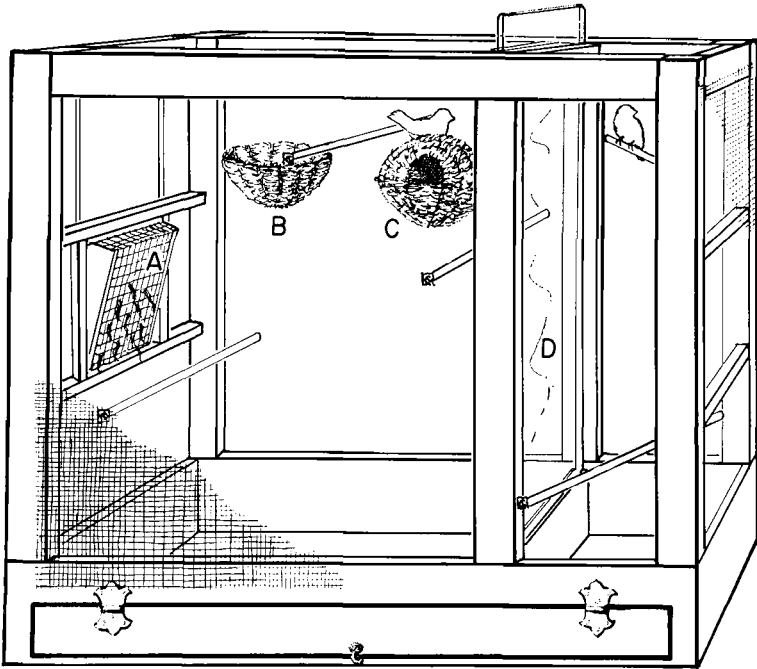


Figure 1. Experimental cage; dimensions are given in the text. A, nest material hopper; B, open nest receptacle; C, domed nest receptacle; D, transparent plexiglass partition. Cage screening has been largely omitted for illustrative purposes.

domed receptacle, and \bar{D} for on top of the domed receptacle (an open site chosen by two builders). The arrangement with the domed receptacle near the stimulus bird's compartment and the cup receptacle at the opposite end of the cage is designated C-D, and the converse arrangement D-C. The experiments and their replicates were run in random order, and the nest receptacle arrangements were alternated between successive replicates of each experiment. Only details of experimental treatments relevant to the present study are given here. Further details of holding conditions and other parameters studied are given in Bruen and Dunham, 1973.

RESULTS

Nests were built by 31 males, principally birds that could see and hear a cagemate (23). As 17 males built under C-D conditions and 14 males under D-C conditions, both receptacle arrangements were equally conducive to building. Most builders chose an open site (22 versus 9) (Chi-square one-sample test, Siegel, 1956, 2-tailed, $P < 0.02$), and most also built on the partition side, near the stimulus bird (23 versus 8) ($P < 0.01$).

TABLE 1
NEST RECEPTACLE CHOICE: ALL BUILDERS EXCEPT \bar{D} ¹

Nest receptacle	Receptacle nearer stimulus bird		Totals
	D	C	
C	7	13	20
D	8	1	9
Totals	15	14	29

¹ Fisher exact test, Csima and Reid, MS, 2-tailed, $P < 0.02$.

As the preferred receptacle and the preferred locale coincided in one-half of the experiments and replicates but not in the other half, the interaction of the two preferences could be examined. In the C-D arrangement no preference was shown for either receptacle (7C, 8D, 2 \bar{D}). In other words about half the builders selected the preferred receptacle, and half the preferred locale (Table 1). The two \bar{D} builders effectively altered their receptacle arrangement to C-C by building in an open site on top of D and nearer the stimulus bird's compartment. In the D-C arrangement, where the two preferences coincided, 13 of the 14 builders built in C ($P \sim 0.001$). Therefore we conclude that the receptacle arrangement (type and location) was very important in determining where the building took place.

What stimuli rendered proximity to the stimulus bird so important in determining the location of the nest? We can only answer this question in part, as the three different treatments were not equally conducive to nest building (see Bruen and Dunham, 1973, for discussion of this point). Only 2 of the 9 isolates and 6 of the 25 birds that could hear, but not see, a stimulus bird built nests. These samples of builders are too small to test separately, and therefore any effects of isolation, and of audible stimuli alone from a conspecific, remain to be established.

TABLE 2
NEST RECEPTACLE CHOICE: BUILDERS THAT COULD HEAR AND SEE THE STIMULUS BIRD EXCEPT \bar{D} ¹

Nest receptacle	Receptacle nearer stimulus bird		Totals
	D	C	
C	4	10	14
D	6	1	7
Totals	10	11	21

¹ Fisher exact test, 2-tailed, $P < 0.05$.

We can however examine the data in Table 2 from the 21 builders that could see and hear a stimulus bird. It is not surprising to find that the effect of nest receptacle arrangement on building location holds for these builders as it did for the total of builders. Therefore we conclude that proximity to the sight and/or sound of a conspecific was a major factor in determining building location. Indeed it had as strong an effect as nest receptacle preference in this determination.

Some of the builders could see and hear a conspecific female, whereas others were exposed to a male instead. They showed no difference in their response under these two conditions, and in fact there was very little difference between them even in subtle measures of nest building (Bruen and Dunham, 1973). Therefore the sex of the stimulus bird played no detectable role in the effect of a conspecific on nest building location under our conditions.

DISCUSSION

In the field and in the laboratory the female selects the nest site (Immelmann, 1959, 1962). The male calls the female to potential nest sites ("Nestlockverhalten") and the female turns her body back and forth on the site in a characteristic manner. A final choice is accepted by both through ritualized behavior. In our experiments the stimulus bird was in forced proximity to one of the sites, but unable to occupy the site, mandibulate nesting material, or contact the male physically. Nonetheless the mere proximity of the stimulus bird had a strong influence on nest location. In one-half of our trials the stimulus bird was in the vicinity of the less preferred receptacle. About one-half of the males were influenced to the extent of building at that location, while the other half used the preferred receptacle. Only under these conditions did we find males building on top of the domed receptacle (a preferred open site) near the stimulus bird (preferred location).

As Zebra Finches build in a variety of different situations in the wild, some paired males and females must differ in their individual preferences for a nest site. It would be interesting to know how members of a pair resolve these differences for their first nesting. Generalizing from our experiments, males differ in the degree to which they are influenced by the preference of a stimulus bird. We suggest that perhaps the female's role in determining a nesting site may be modified by the kinds of sites to which the male calls her. Subsequent nesting by the same pair (they are reported to pair for life) may present less of a problem, considering Sargent's (1965) demonstration that previous nesting experience can modify substrate and "habitat" preference.

ACKNOWLEDGMENTS

We are grateful to T. E. Reed for the loan of statistical tables, and to Miss R. Rowlandson for preparing Figure 1. Financial support was received from a National Research Council of Canada operating grant to D. W. Dunham.

SUMMARY

Male gray Zebra Finches were tested for nest receptacle type preference and for the effect of a confined conspecific stimulus bird on building location. An open cup was preferred to a closed basket, and proximity to a conspecific was preferred to a more distant location. Interaction between the two preferences showed that both were equally important in determining where nest building took place.

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