The Educational Benefits of Wild Bird Feeding for Children

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"Whether they are princes, tycoons, housewives or kids, they tend to be a bit more civilized, a bit more aware, than most non-watchers."

—Ornithologist Roger Tory Peterson describing bird watchers

Abstract

This study evaluated an educational home-based program for feeding wild birds, intended to increase elementary school age children's knowledge about birds, especially those wild birds commonly encountered at outdoor home feeders. We measured changes from pre- to post-program in children's knowledge about wild birds, as well as in environmental attitudes. The goal was not only to increase bird knowledge in the target child but also to involve other family members in home-based nature education activities.

The beneficial effects of companion animals (mostly dogs and cats) for children (Beck & Katcher, 1996; Melson, 1991; Melson, Peet, & Sparks, 1992; Melson, Schwarz & Beck, 1997) as been well documented. Caged birds appear to play many of the same roles for people as dogs and cats. The nature of the interaction involves talk, touch, care giving, and the assumption of real communication. As there appears to be little difference with breeds of dogs or cats, there appears to be little predictable difference that one can see with different species of birds (Beck & Katcher, 1989). Nearly 20 years ago, the first pet intervention study compared elderly people (65 years of age and older) living alone that were given either a plant or a small bird and television ownership was also considered. Having a bird appeared to improve morale and increase visitors; the birds served as a "social lubricant" (Mugford & M'Comisky, 1975). Younger bird owners were found to be more socially outgoing and expressive compared to owners of horses, turtles and snakes (Kidd, Kelly, & Kidd, 1984).

Interactions with wild animals are assumed to be of value though much less studied. The programs that permit children to interact with animals are the most popular aspects of zoos. More than half of all American zoos have areas where children can touch animals (children's zoos) and they are the most popular attractions. Riding and feeding animals are also important activities for young people (Kreger & Mench, 1995). In addition, children are fascinated by seeing birds fly and they learn how to see and listen and "Bird watching may be the most popular and easiest of outdoor activities" (Griffin & Griffin 1995). Birds capture the interests of children. "First-hand experience sensitizes a child to the needs and demands of living creatures as watching Captain Kangaroo never could" (Mahnken, 1983).

In 1991, the U.S. Fish and Wildlife Service estimated that almost 25 million Americans took a trip for the primary purpose of observing, feeding or photographing wild birds and 63 million people fed wild birds at home (Dickinson & Edmondson, 1996).

A questionnaire of 98 adult bird feeders identified aesthetics as the major motivation (Horvath & Roelans, 1991) for their activity. More extensive interviews with 2,455 randomly selected Americans in 48 contiguous states also found that most people watch birds because of aesthetics, that is, birds are pretty to see. For committed (experienced) birdwatchers, being fascinated with birds is the most common reason for their involvement. For the general (novice) watcher, the second most reason for the involvement after aesthetics, was being close to nature and then to be with family and friends (Kellert, 1985). Mail-back questionnaires of 787 in Alberta, Canada, found that bird watching is influenced by peers and family participation. Most birders (60%) begin as adults though 54% of advanced watchers started as children compared to novice ones. The most common social group of participation for childhood beginners was family, which is like most recreational activities. The family was the most important influence in advanced birders, more than peers and social organizations (McFarlane, 1996). As a general rule, leisure recreational activities of childhood are not related to adult activities, however ice fishing, nature photography and gardening often carry-over to adulthood (Yoesting & Burkhead

1973; Yoesting & Christensen, 1978). Bird watching, while not specifically studied, may very likely also be an activity that becomes part of a person's recreational activities.

There is widespread belief that activities related to wild bird feeding—including watching birds at the feeder, feeding them, and learning about species of birds and their needs—may promote appreciation of birds and other wildlife, conservation and concern for endangered species, and even greater ecological awareness and environmental sensitivity. Wild bird feeding, which is even more common that bird watching, is one of the most common ways in which people interact with animals, may offer the same value as other interaction with animals. This would be analogous to the observation that pet ownership is associated with care for laboratory and farm animals and wildlife and is somewhat correlated with empathy for humans as well (Paul & Serpell, 1993).

Some interview studies with adults found that the feeding of wild mountain sheep (Lott, 1988) and free-ranging cats (Haspel et. al., 1990) appears to be mutually beneficial, that is, the animals benefit too. There is a lack of well-documented studies on the impact of wild bird feeding. Establishing such impact requires monitoring bird feeding over time and measuring changes in desired outcomes from before to after sustained bird feeding.

There are studies of the value of family involvement in childhood learning experiences in museum settings, which show that the experience complements the acquisition of information for all involved (Hilke, 1989). Surprisingly, information about children's wild bird feeding is nonexistent. However, whenever there are children in a household, adults who feed wild birds will inevitably expose their children to wild bird feeding. Thus, millions of children are currently experiencing wild bird feeding in some form within homes (not to mention at schools, day care centers and other institutions that serve children). The short- and long-term impact of these experiences is unknown. Childhood bird feeding may provide an important (although undocumented) source of enjoyment for children, and may affect knowledge about and

appreciation for wild birds and other wildlife as well as environmental concerns. In addition, childhood experiences may later affect adults when they become potential wild bird feeders.

For this reason, we focused on children, within the family context. The study used established and novel measures of knowledge and attitudes before and immediately after the implementation of a ten-week bird-feeding program. Parent and child involvement during the program was monitored every 2 weeks. A one-year follow-up assessed continued interest in birds and bird feeding.

The overall goal of the project was to determine if participation in a home-based wild bird feeding program would be associated with changes in children's knowledge and appreciation of wild birds, and also might generalize to concern for environmental issues, such as conservation, recycling, and protection of natural resources. We examined whether variations in the characteristics of child (age, sex), parent (education, income, employment), or family (for example, family involvement in nature activities) were associated with pre- to post-program change. Finally, we sought evidence of family involvement beyond the target child as a result of a home-based learning program.

Methods

Participants

Sixty-five families were program participants. In each family, there was a target child between 7 and 12 years of age enrolled in the program. The children in the sample consisted of 36 females (56%) and 29 males (44%). The majority of the families (*N*=61, 95%) had more than one child. The average number of siblings in the participating families was 2.78 (*SD* 1.82). See Table 1 for distribution of age and sex of participating children. The parents' ages ranged from 24 to 52 years, with a mean age of 38 years. Average parental level of education was "some years of college." The majority of the mothers (*N*=29, 55%) worked outside the home and on average, were employed 30.55 hours per week. Fathers worked on average 45 hours per week.

Average family annual income was between $25,00 and $50,000. A wide range of occupations was represented, from blue-collar workers to highly paid professionals.

Procedures

Families were recruited through television, radio, and newspaper announcements, as well as flyers. A total of 86 families expressed interest in participation. After screening for two criteria--families could not be feeding birds at the time, and the family had to have a child between 7 and 12 years of age—sixty-five families were eligible, and all agreed to participate.

Preprogram assessment: A preprogram home visit was conducted by a pair of trained interviewers. One interviewed the child, and the other interviewed a parent. (The parent selected was the one who identified herself or himself as most involved in daily child-rearing. This was generally the mother.) Before the interview began, the parents as well as the children read and signed a consent form.

Each family received the following materials at the first visit: a wooden bird feeder, a 40 pound bag of bird seeds, and a scoop, all provided by the Kaytee Avian Foundation. Each child also received the following items, intended to supplement and enrich their wild bird feeding experience: two books (Zim & Gabrielson's [1987] *Birds - A Golden Guide*; Bonfore's [1982] *Fifty Favorite Birds Coloring Book*), a folder containing a variety of bird charts provided by the National Bird-Feeding Society, bird pictures for the children to color, games to test children's knowledge about birds, a logbook for recording birds seen at the feeder, and a set of instructions on how to build a bird house, although a fully constructed bird house was provided.

The parent completed a demographic questionnaire. The target child completed the following: a child demographic questionnaire, a bird feeding facts assessment, a bird picture recognition measure, a bird color recall measure, and a questionnaire assessing ecological attitudes. The interviewer of the child asked all questions and recorded the child's oral responses.

During program assessment: During the 10-12 weeks of the program, four telephone

interviews, each two weeks apart, were conducted with each family. At the first and third interview, the parent responded to a set of questions assessing type and extent of participation. At the second and fourth interview, the target child responded to the same set of questions. At the first call, ten families could not be reached, and at the third call, twenty families could not be reached. At the second and at fourth phone call, twenty children could not be reached.

Immediate post-program assessment: After 10-12 weeks, a post-program home visit to each family was made. At this visit, the participating parent completed both a quantitative and qualitative evaluation of the program. Each target child completed the same measures given at the preprogram visit (with the exception of the child demographic questionnaire). At the end of the visit, each child received a certificate of program completion, a "Junior bird watcher" card, some bird stickers, and a bird puzzle. The interviewer collected the bird log.

Long-term followup: One year after the last home visit, a phone interview was conducted with each participating parent to determine if the families were still feeding birds and if so, the extent and type of bird feeding activity. (Ten families could not be reached, due to change of address or phone number).

Measures

Parents' demographic questionnaire: During the initial visit, the following background information was obtained for both mothers and fathers: age, level of education, employment status, and hours per week of employment. Additional demographic information included: ~~[number of what?]~~ number, age, sex, and birth order of all children, current family gross income, type of family dwelling, and years lived in the community. To assess parents' general involvement with the target child, we asked each parent to rate the amount of time during the previous week (0=not at all; 9=a great deal) she spent in each of 18 home-based activities with the target child (for example, "do gardening with your child," "help your child with homework) and then indicate if the previous week was a typical one or not. The parent also rated the

frequency (never, once or twice, 3-5 times, 6 or more times) in the past year of each of 27 outside home leisure activities with the target child. Eleven of these activities were nature-related (for example, “go camping,” “go to a park“) and 16 were not specifically nature-focused (for example, “go out to eat,” “go to a movie”). Finally, two open-ended questions asked the parent to identify personal hobby or leisure activities at home and away from home.

A parent nature interest score (0 – 46) was derived by summing nature-related personal leisure activities or hobbies at home (1=yes; 0=no) and away from home (1=yes; 0=no) plus the frequency of the following nature-related parent-child activities: garden with child; go to the zoo; go to an aquarium; go camping; go hunting; go to the Wolf Park (a local preserve); have a picnic; hike; do water activities (i.e. canoeing, rowing); go to the beach; go to a park; and any other activity mentioned that was related to nature or environment (i.e. cross-country skiing).

Three measures of bird knowledge, developed for this study, were completed by each child. The Bird feeding Facts (BF) measure assessed knowledge about wild bird feeding and the characteristics of birds commonly seen at feeders through six open-ended questions, for example: “What kind of birds do you think you will see at the bird feeder?” Each response was scored as 1 if possible (e.g., cardinal) or 0 if not possible (e.g. flamingo) and summed for a Bird feeding Facts score (0-6). Scoring was done twice by a team which included an expert in zoology and an expert in child development.

Bird Picture Recognition (BPR) measured the child’s ability to correctly identify, from color photographs, four species of adult male birds commonly found in the program area at feeders: Northern Cardinal, Blue Jay, American Goldfinch, and Red Headed Woodpecker. (The pictures were from slides provided by the Kaytee Avian Foundation.) Two species, Cardinal and Blue Jay, are large and well-known, and were judged to be relatively easy for children to identify. The other two, American Goldfinch and Red Headed Woodpecker, were judged to be less common

and therefore, more challenging for children to identify. The sum of each correct identification yielded a bird recognition score (0-4).

Bird Color Recall (BCR) measure assessed the child's ability to reproduce the color and diacritical markings of three species--Northern Cardinal, Blue Jay, and Mourning Dove--chosen to represent a hypothesized range of difficulty from easy (Cardinal), to moderate (Blue Jay), to difficult (Mourning Dove). Each child was asked to color in three black and white line drawings of birds, reprinted from the National Bird-Feeding Society, as they "really looked like." Together, one of the main investigators and the research assistant coordinator for the project rated all the pictures. Each picture was scored as zero (inaccurate colors, for example, a purple cardinal), 1 (accurate color, no diacritical marks; e.g., Cardinal - black bib; Blue Jay - marking in the wings; Mourning Dove - spot on the neck.), 2 (accurate color plus one mark), 3 (accurate color plus two marks), or 4 (accurate colors and all diacritical marks). Individual picture scores were summed for a bird color recall score (0-12).

Environmental attitudes: Each child completed the 25 item Children's Attitudes toward the Environment Scale (Musser and Malkus, 1994). This measure is developmentally appropriate for the age range of our sample and has good internal-consistency (Cronbach's alpha above .70) and test-retest reliability ($r = .68$, $p<.0001$ after 8 weeks). Each item poses two options (i.e., ``Some kids like to leave the water running when they brush their teeth'' but ``other kids turn the water off while brushing their teeth''). The child chooses the option that best describes him or her and then endorses the choice "a little bit" or "a lot." Each item is scored from 1 (strong endorsement of environmentally insensitive option) to 4 (strong endorsement of environmentally sensitive option) and summed for a total score (25-100).

Child demographic questionnaire: In addition to age, sex, and grade, each child was asked about pet ownership (type and number of pets, if any) and about general preferences (favorite television shows, favorite subject at school, preferred non-school activities, favorite

animal). A child nature interest score was the sum of all nature-related responses to preference questions. A set of questions about environmental concerns (i.e., “Do you think there are problems about the environment that people should be worried about?” [If yes], “What are they?” “In your family do you: recycle newspapers, use paper plates, use a garbage disposal, recycle cans or bottles?”) yielded a child environmental concern score (0-7) based on the sum of each affirmative and relevant response (paper plate and garbage disposal use reverse scored).

Program involvement: During each phone interview during the program, the parent or child was asked 12 yes-no questions (for example, “Has anyone in the family put wild bird seed in the feeder?” “Has anyone watched birds at the feeder?”), the frequency of each behavior (0=never; 1= once or twice; 2=weekly; 3=daily or several times per day), and the family members involved. A composite participation score for each interview was derived by summing individual question scores. Data for three or more interviews was available for 68% (*N* =44) of families.

Immediate post-program parent evaluation: At the second visit, within two weeks of program completion, each participating parent completed an eight-item rating scale (1=strongly disagree; 5=strongly agree) of program impact (for example, “My child learned about birds from this project,” “My child used the educational materials frequently”). One item—“My child was the only member in the family who participated”—was reverse-scored. A parent evaluation score was created by summing individual item ratings.

Each parent also completed six open-ended questions, three asking about aspects of the program the parent “liked best,” and three asking about aspects that the parent “liked least.” Content analysis of these responses, following the method recommended by [insert ref], yielded two dichotomous categories—child vs. family focus and knowledge vs. relationship focus. The first category referred to perceived program effects as restricted to the target child (child focus)

or involving other family members as well (family focus). The second category referred to parental perception of program effects as primarily increasing bird knowledge (knowledge focus) or primarily fostering greater family interaction and communication (relationship focus). A fourfold table resulted: child and knowledge focus, child and relationship focus, family and knowledge focus, family and relationship focus.

Delayed post-program assessment: One year following the end of the program, 74% (*N* = 48) of participating parents were recontacted and interviewed by phone. They were asked if they were still birdfeeding, and if yes, the same 12 program involvement questions were asked. A composite delayed post-program score was computed by summing individual question scores.

Results

Preprogram bird knowledge

Mean responses for boys and girls at younger (7-9 years) and older (10-12 years) ages pre- and post-program are presented in Table 2. Note that across the age range studied, when shown a color photograph, children could supply the names of commonly seen birds at feeders only about half the time. The bird color recall measure proved the most difficult, with children, on average, accurate only one-third of the time. In general, children performed best on questions about bird feeding facts, indicating considerable knowledge of birds and other animals likely to be seen at feeders, best times of day for seeing birds, best ways to identify different birds, and differences in appearance between male and female members of the same species.

Scores on the three preprogram bird measures were significantly correlated. Bird picture recognition scores were positively related to bird color recall scores (r =.32, p<.005) and to bird feeding facts scores (r =.40, p<.001). Bird color recall and bird feeding facts scores also were related (r =.41, p<.001). Because of this and also to reduce the number of analyses, a combined preprogram bird knowledge score was constructed as the sum of the component measures.

Correlational and t-test analyses examined child and family demographic characteristics in relation to preprogram bird knowledge and environmental attitudes. There was only one significant result; age of child was associated with bird knowledge (r = .31, p<.05); not surprisingly, older children were more knowledgeable about wild birds commonly seen at feeders. There was no relation between parent's or child's nature interest or child's environmental concerns, as reported during the initial interview, and children's preprogram bird knowledge or environmental attitudes.

Pre- to immediate post-program change

For each target child in the program, we computed a change score (post-program minus preprogram) for bird knowledge and for environmental attitudes. Forty-nine (75.4%) of children improved in bird knowledge, 6 (9.2%) showed no change, and 10 (15.4%) received lower post-program than preprogram scores. Pre- to postprogram change was associated only with parental education (r = .35, p<.006); children whose parents were more highly educated showed greater improvement. Extent of program participation, as measured by responses to the phone interviews, was unrelated to change in bird knowledge.

There was no pattern of change in environmental attitudes. Slightly more than half of the participating children expressed more positive environmental attitudes (56.9%) after the program. Change in bird knowledge was unrelated to change in environmental attitudes (r = .09).

Bird logs: [insert data from them.]

Parent evaluation of program impact

The evaluation ratings indicated that parents endorsed the program as a learning experience for their children. The average score was 32.34 (std. = 3.36) out of a maximum possible 40. Responses to specific items indicated that 60 of the 64 parents agreed or strongly agreed that their child learned about birds from the project, 55 of 64 agreed or strongly agreed that their child learned about nature, and 51 of 64 agreed or strongly agreed that their child

would like to continue bird feeding after the program ended. The educational materials (books, logs, and posters) were of more mixed success. Fifty-six of 64 parents believed they were appropriate for the child (only one parent disagreed and seven were unsure), but fewer parents (40 of the 64) agreed or strongly agreed that their children actually used these materials. One reason may have been the time demands that full use of the materials may have imposed on children with very busy schedules. Ten of the parents found the project “time-consuming” and an additional six parents were “not sure” about this.

An important finding from the parent evaluation was the extent of family involvement, including that of other children. Fifty-three of the 64 parents felt the program “increased family interaction” and only two parents disagreed with this statement. In only ten families was the target child reported to be the only child who actually participated in the project; most of these were one-child families. The content analysis of the open-ended responses indicated that more responses fell into family and knowledge focus category than any other (n = 14 vs 2 in others). Parents’ final evaluation was unrelated to their children’s change scores. Parents overwhelmingly perceived the program to have benefits, even when their children did not score significantly higher on the specific bird knowledge and environmental attitude measures.

The parents’ responses to the open-ended questions also were informative. When we asked each parent what they liked most about the program, not surprisingly, many parents identified the excitement of attracting new birds, identifying new birds, and watching birds. Said one parent: “Seeing the birds! I never realized how many beautiful birds would come to just one feeder.” Another parent responded: “I liked that the bird feeder and feed brought the birds to us where we could identify them with the book provided and observe their behavior.” Another mother noted, “ My son learned more about birds and I found him referring to the materials quite often.”

Perhaps the most striking pattern in the parents’ responses to the open-ended question, what they liked best about the program, was the repeated reference to the wild bird feeding

program as an enjoyable family-based activity, one that promoted family interaction. One parent wrote, “The whole family was involved.” Another noted: “Everyone in the family got involved—even our one and a half year old actively looked for birds and squirrels at the feeder. She learned to say “bird” during the program.” A typical response was: “Everyone in the family enjoyed watching the birds in the front window.”

In the parents’ comments, there were additional indications that children other than the target child often became involved and according to the parent, also learned. For example, one mother wrote: “Having one child involved made my other children more interested in learning names of birds, looking at materials we had elsewhere in the house about birds.”

We also asked parents to identify aspects of the program that they “liked least”. Interestingly, no parent identified the family-based aspect of the program or family involvement as least liked. (A few mentioned that they felt “guilty” if they failed to feed the birds or use all the educational materials.) A common response involved difficulties with squirrels and other animals at the feeder. For example, one parent wrote about “the big mean raccoon who enjoyed the bird seed and cornered me on the back porch in defense of his prize.” Another parent complained of “the mess generated by the sunflower seeds.” A few parents wished for more extensive education materials, a more elaborate birdfeeder, and more frequent interaction with the research staff.

Delayed post-program assessment

Based on responses from 74% (*N* =48) of participating parents, one year later, all but 6 were still feeding wild birds. The target child or “whole family” were reported to be putting seeds in the feeder (22 out of 41), watching birds (35 of 41), 31 of 41 using educational materials, 32 of 41 looking at bird book, and 39 of 41 talking about bird feeding. Most families reported weekly birdwatching and feeding, and use of educational materials once or twice a month.

Discussion

This ten-week home based wild bird-feeding program had a measurable positive impact on children's knowledge about birds. Parents strongly endorsed the program as a positive learning experience. As we hoped, the bird-feeding program drew in other family members, especially siblings of the target child and became an activity in which the whole family participated. Feedback from parents suggests that supplying a birdfeeder and feed alone, without educational materials, might be less effective in increasing knowledge and appreciation of wild birds.

It would be important to emphasize the importance of basic good hygiene when being around wildlife, including birds. Contact with wild birds or the feces was associated with an increase risk of *Salmonella* infection. People should be careful when cleaning bird feeders, avoid sick birds, and not eat the snow under bird feeders (Kapperud, Stenwig, and Lassen, 1998).

There are numerous limitations of this study, which should be viewed as an exploratory investigation into a new research area. We did not randomly assign families to bird feeding vs. no bird feeding. Because families with some interest in bird feeding (and no previous experience) contacted us for participation, the participants were already quite motivated, and the learning effects might not generalize to all families. The families also were not representative of the U.S. population. Although a wide range of socio-economic levels was represented, few minority families participated, despite wide outreach through advertising. Because the study was geared to children in the elementary school grades, the impact of bird feeding on younger, preschoolage children or on adolescents is unknown.

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Average Pre and Post Program Scores

	Younger (7-9)				Older (10-12)				
	Boys (N=18)		Girls (N=24)		Boys (N=10)		Girls (N=11)		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Max
Bird Knowledge (BK)	4.38	5.33	4.81	5.33	4.86	5.40	5.69	5.64	6
Bird Picture Recognition (BPR)	2.50	3.06	2.48	3.26	2.70	3.20	2.73	3.18	4
Bird Color Recall (BCR)	3.89	4.50	4.67	5.75	4.50	5.60	5.09	6.00	12