

Social Evaluation of Female Preferences in Birds' Songs and Songs Function in Mating

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Abstract. The selection of a mate is influenced by bird songs, which are known for their complexity and diversity. This essay delves into the realm of female mate preferences within various avian species, presenting both supportive and contradictory evidence regarding the importance of larger song repertoires. It emphasizes the distinction between controlled laboratory settings and ecologically authentic field studies, revealing nuanced findings. Furthermore, it explores additional factors like individual variation, song complexity, cognitive abilities, and contextual adaptability to elucidate this mixed outcome, enriching our comprehension of avian communication dynamics. Male bird songs emerge as essential conduits for conveying vital information that enables females to make informed choices about potential mates. Through song types and tones, they transmit demographic information, social status, and physical condition, offering females a means of remote evaluation. The examination of distinct song behaviors, including duets, flight songs, and the dawn chorus, highlights their significance as indicators of partnership, strength, and commitment. The varied strategies employed by male birds and the selective decisions made by females underscore the profound role of avian songs in shaping relationships and ensuring the perpetuation of species. This marks a substantial contribution to our understanding of avian mate selection dynamics.

Keywords: animal behavior, bird song, mate choice, oscine, songbird

1. Introduction

The existing research suggests that gaining insight into mate selection criteria within the Hume's warbler (*P. humei*) can be achieved by investigating the correlation between male traits, song characteristics, and female mate preferences [1]. It is evident that in this species, females make their mate choices based on a combination of visual cues and song attributes, suggesting that females may assess male quality by observing subtle variations. Additionally, songs characterized by short durations and rapid ascents to maximum amplitude were associated with early clutch initiation. Interestingly, females that initiated breeding early produced more offspring that not only survived but also exhibited faster growth rates, despite not laying larger eggs. This suggests that a female's preference for larger males could be influenced by their heightened ability to provide for their offspring or their occupancy of superior territories with access to abundant food resources.

Searcy provides evidence of female preferences for larger song repertoires in birds, specifically focusing on female common grackles and explores various hypotheses, including natural and sexual selection, to explain the evolution of female birds' preferences for large repertoires [2]. Laboratory experiments consistently demonstrate that female birds exhibit a preference for males with extensive repertoires. However, field observations suggest that in natural settings, the impact of repertoire size on female choices of living and breeding arrangement is, at most, modest.

Moreover, it is proposed that female preferences for extensive repertoires might pre-date the emergence of male song repertoires. These male song repertoires, it is posited, evolve to capitalize on the pre-existing bias in female response. Interestingly, similar response patterns to multiple song types are observed in a variety of sparrows. Multiple hypotheses have been proposed to explain female preferences for large repertoires, including obtaining superior territories, receiving paternal support, or selecting mates with advantageous genetic traits.

The fundamental reason for the lack of definitive support for Bruce and Donald's prediction that female songbirds prefer mates with extensive repertoires is the inherent difficulty in accurately

manipulating male songbird songs signals [3]. While certain studies have shown that repertoire size can impact female mate selection, others have failed to establish a clear connection. In essence, this research highlights the inherent difficulties in justifying the notion that the choice of the female partner depends on the scale of the male repertoire. Additionally, it introduces alternative theories about the evolution of song repertoires, emphasizing the importance of signal diversity and intricate vocalization patterns in this context.

2. Social values and female preferences of songs

2.1. Case Analysis

A comprehensive study looked at the connection between female mate preference and songbird song repertoire. 47 studies that looked at song or syllable repertoire size and female partner preference in a variety of songbirds, such as song sparrows, sedge warblers, pied flycatchers, European starlings, and house finches, were analyzed by researchers [3]. The theory that females favor males with greater song repertoires was supported by 25 of the 49 research in the publications, covering 19 species; the remaining investigations, which included 16 species, did not support this hypothesis.

Despite the inconsistent findings, there have been studies on female mate choice in songbirds that have been examined, with around half suggesting a repertoire-size effect. It's important to note that the majority of these encouraging findings were derived from well-designed lab trials that may not accurately reflect real-world partner selection situations. Recognizing the potential for publication bias to affect the confirmation rate is also crucial. Field studies that have better ecological validity, despite their methodological flaws and correlated nature, typically do not uncover repertoire effects.

One possible explanation for this conflicting outcome is that in certain species, females may exhibit a preference for males with larger repertoires, while in other species, such a preference may not exist. This variation in female mate choice could account for the disparities observed in research findings.

However, if this were the case, it would be reasonable to anticipate that good results would be dispersed at random among various study types. Positive results, however, are more prevalent in laboratory investigations, which raises the possibility that there are other affecting factors.

Even when focusing on species that underwent many experiments, the argument that inter-species differences are responsible for variability in study outcomes is unconvincing. The findings of eight out of twelve species investigated showed both positive and negative results, indicating significant inconsistencies within the species. As a result, it is not appropriate to merely attribute the overall irregularity in the broader sample to between-species variations.

There could be further attributions, such as individual differences and music genres. When it comes to songs, individual differences among songbirds can have a major influence on female partner selection. The research of female choice is made more challenging by these variances, which are brought on by elements including song repertoire size, learning processes, contextual flexibility, cognitive capacities, and social interactions. As scientists learn more about how these individual characteristics interact with female choice, a more full picture of the complex dynamics of songbird mate choosing may start to take shape. The acceptance of individual diversity opens the door to more in-depth analyses of the connections between female partner preferences and song repertoires.

2.2. Variance in female Preferences of Songs

2.2.1 Variability in Song Repertoire

Individual inequalities are a direct result of the inherent variety in song repertoire size. Male birds can display a wide range of repertoire sizes, even within a same species. While some males may have relatively small but varied song collections, others may have larger songbooks but with less diversity. It has been shown that greater song repertoires can elicit a preference from female birds of different species during courtship, which could influence the mate selected during extra-pair copulations [2].

The variation in song repertoire size among different male songbirds can be influenced by a wide range of variables. A bird's song repertoire may vary depending on factors including age and experience. In oscine species, young birds frequently create a wider range of sounds during development, whereas adult songbirds typically employ narrower repertoires than they did earlier in life. Evidence suggests that adults can still express songs that have been abandoned, and that song diversity may be constrained by normal song development. Some populations of black-capped chickadees have multiple song types in their repertoires rather than just one, and adult birds with disturbed or artificial song development can have abnormally wide song repertoires [4].

2.2.2 Learning and Cultural Transmission

The process of learning songs is difficult, and even within the same species, individuals can differ in the intricacy and song structure. Some birds, like Marsh Wrens, may have a strong propensity to duplicate a particular song, but Sedge Wrens may add new elements to or alter old songs [5–6]. Each male's song might be unique due to individual learning paths and unusual combinations of song parts. Social stability is largely to blame for this discrepancy. Sedge wrens wander around, however marsh wrens stay put permanently, suggesting that marsh wrens are always exposed to songs that sound similar, allowing them to imitate and create a shared-song territory.

Female preferences may also be influenced by social stability. Females who were exposed to a wide variety of songs may have developed preferences for particular song qualities based on their learning experiences. This might influence how each person chooses a mate differently. For instance, a female exposed to a wide range of song styles during her maturation may develop a preference for males who sing similarly to those she was exposed to.

2.2.3 Contextual Flexibility

An amazing facet of avian communication is how individual male songbirds can modify their song behavior depending on the situation they are in. Males may alter their songs in reaction to the presence of potential partners, rivals, or even the surroundings. Females may learn more about a man's awareness of his environment and adaptability from his contextual flexibility [7].

Because it shows the male's capacity to adapt to changes in the environment or social dynamics, females may favor adaptable males. This is in line with the theory that females don't just select mates based on a fixed set of features, but also take into account a male's capacity to give future offspring adaptive advantages.

2.2.4 Cognitive Abilities

Songbirds' cognitive abilities are remarkably diverse, and they have an impact on the complexity and structure of their songs. It's possible that some males are better than others at incorporating complex rhythms or avant-garde components like trills into their songs [1]. Trills call for quick and precise motions of the beak, syrinx, and respiratory system. When the trill spans a wide frequency range with noticeable differences between its highest and lowest frequencies, this becomes more difficult. Such songs require a lot of work to create, which may reveal a singer's cognitive prowess [8].

Males who can convey better cognitive capacities through their songs may be preferred by females who are sensitive to changes in song complexity. Such preferences might signify a female's desire to choose a mate with the ability to provide their progeny improved learning abilities, improving the likelihood of successful survival and reproduction.

2.3. Songs benefits in mate selection

Songs in the avian world have several benefits for choosing mates, many of which are still unknown. Two of them - as information carriers and as tools for distant evaluation - will be the subject of this article. The diverse song styles and tones enable females to judge men at a distance and help transmit information about age, identify, and social position.

2.3.1 Conveying Information Through Song Types and Tones

Songs are intricate communication networks that not only express melodies but also a wealth of information. Potential partners get distinct messages from songs of varied genres, tones, and complexity. The delivery of essential demographic data is one important feature. By examining the subtleties of a man's song, females can infer important details about his age, identity, and social standing.

Different song genres typically represent a person's age. Older, more seasoned males may have elaborate songs that have evolved, whereas younger, less experienced males may have songs with less intricacy or refinement [8]. For females with discerning ears, this difference in song quality subtly conveys age-related information. Additionally, different music genres can act as "identification codes," enabling females to identify particular people based on their distinctive vocal traits.

Social status is a significant topic that is communicated through music. The intricate and complex songs of dominant males often reflect their higher social standing in the group. This illustrates both their physical prowess and their capacity to defend their territory against intruders. On the other hand, inferior males could have more straightforward songs that reflect their social rank.

Important information about a bird's general health, physical condition, and environmental situations can be gleaned from its singing habit. A well-fed bird with access to plenty of food sources can be inferred from a bird's consistent and vigorous song [9]. This behavior is a symptom of the bird's excellent physical health and the absence of concerns about energy saving when foraging. A full stomach provides the energy needed to play music at high volumes.

Unceasing and persistent singing denotes extraordinary fortitude and resolve. Physical exertion and large amounts of lung capacity are needed for singing. Long-term song production by a bird demonstrates its endurance and tenacity. This characteristic becomes especially important during the breeding season, when males compete for the attention of females. Long-lasting singing is frequently a sign of the male's capacity to outlast rivals and maintain a strong presence in the competitive mating arena [11].

2.3.2 Enabling Informed Mating Decisions

The ability of bird songs to travel over great distances is one of their most amazing characteristics. This is especially helpful in environments with poor visibility, such dense woodlands. Songbird females can take use of this trait. Females can gather important information without having a direct physical encounter by listening to male songs at a distance. This evaluation offers females a glimpse into a man's health, vigor, and general readiness for mating [1].

Females are innately picky in who they choose to mate with since they invest a lot in their reproductive health. Selecting a man who has the potential to be a good father is crucial [11]. It is a wonderful adaption to be able to assess possible mates without taking needless risks or using up unnecessary energy. Females are empowered to make thoughtful decisions that are in line with their tastes and reproductive aims thanks to the depth of information that songs communicate.

2.4. Unusual song behaviors and relationship between mates

Duetting, flight songs, and the dawn chorus are three famous behaviors that offer fascinating insights into how social values influence female partner selection.

Female preference for these three actions is significantly influenced by the male's capacity to display traits that represent social values, such as collaboration, strength, commitment, and reliability. Males can convey their suitability as mates through these actions without having to interact directly. These actions are assessed by females as markers of a male's capacity to support their shared objectives of successful reproduction and relationship, which affects their choice of mate.

2.4.1 Duetting

Duetting, as a remarkable behavior seen in a variety of bird species, such as the Australian Magpie and the Northern Mockingbird, offers an incredible method by which social values affect female mate preference. Pairs of birds - males and females - will vocalize in unison, encouraging the development

of pair bonds [10]. It displays their capacity for successful communication and teamwork, which reflects common social values of cooperation and cooperation. Additionally, duets are frequently employed to claim territory since their harmonized sounds declare their shared presence in a particular location. Because it demonstrates a partner's commitment to upholding a cooperative relationship and safeguarding shared resources, female birds may choose mates that can duet.

2.4.2 Flight Songs

A further lens through which social values affect the mate preferences of females is provided by flight songs, which are typically sung by male birds during aerial displays. The rich melodies of these songs stand out because they commonly include trills, whistles, and cries. The vigorous demands of flight songs show a man's physical strength and vitality. Because they symbolize a male's capacity for protection and provision, which represents social values of strength and survival, female birds may be lured to these displays. The complexity of flight songs also highlights a male's commitment to courtship and, maybe, future parenting obligations, and reflects his involvement in finding a partner.

2.4.3 Dawn Chorus

There are concerns regarding the morning chorus' function in female partner choice because it involves birds singing in unison at the crack of dawn. This action could be in line with social norms like dependability and zeal. Participating in the dawn chorus demands energy and vocal skill, therefore being able to do so could be a sign of a man's health and vigor. Sensitive females may view such males as reliable mates who can actively participate in the everyday tasks necessary for their shared survival and reproduction. As a result, the morning chorus offers a setting where social values and mate choice collide.

3. Conclusion

The intricate connection between female partner preference and song repertoire in the world of songbirds tells an enthralling tale of avian communication and evolutionary dynamics. With their numerous species and complex vocalizations, songbirds present an enthralling opportunity to comprehend how the natural world's symphony shapes the complex dance of partner choosing.

In this study, the connection between female preferences and the tunes sung by male songbirds is thoroughly investigated. Previous research has produced mixed results, with some studies suggesting that women like males with larger song repertoires while others failed to find any clear preference. We may study the effects of diverse circumstances, individual differences among birds, complexity of songs, cognitive abilities, and how well birds adjust to their environment thanks to the range of results. These factors have a big impact on how birds communicate and choose partners.

Male bird songs are amazing communication instruments that convey a lot of data. They communicate to females the age, social standing, and general health of a bird. Female birds can determine from these songs whether a bird would make a good mate. Duetting, flight songs, and the dawn chorus are examples of behaviors that demonstrate how social values affect female mate selection. These actions exhibit traits that females value in a mate, such as cooperation, strength, dedication, and dependability.

Focusing on songbirds teaches us about how natural selection and evolution change how birds communicate with one another, assisting species in surviving and procreating. This knowledge isn't limited to studying birds; it also sheds light on more general issues like sexual selection, communication methods, and reproductive activities.

The varying outcomes across species and study types demonstrate how intricate this topic is. The majority of the study's data comes from lab tests and field research, which may not accurately reflect the complexity and variety of actual mating dynamics in bird populations. The conclusions of the essay are likewise constrained to a certain period and a particular species. Studies and experiments that directly compare the effects of social differences and female preferences are scarce. Future research and experiments are required to confirm the theories that social differences and values

influence female preferences. It is crucial to conduct a comprehensive investigation that takes into account a variety of factors, including needs for survival, reproduction, recreation, and social interaction.

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