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Tapping birdwatchers to promote bird-friendly coffee consumption and conserve birds

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Abstract

1. Though coffee was traditionally grown as an understory crop beneath mature trees (i.e. 'shade-grown' coffee), most farms have been converted to full-sun monocultures over time, which fail to support ecosystem services or biodiversity. The conversion from shade- to sun-grown coffee has prompted the development of environmentally focused certifications, such as Smithsonian Bird Friendly® coffee, as one market-based strategy to incentivize sustainable production of coffee.
2. Birdwatchers, of which there are 45 million in the US alone, are among the primary targets for coffee certifications—partly due to their high propensity to participate in and pay for conservation activities that benefit birds. Yet birdwatchers still represent a small market share of certifications, and their purchasing preferences relatively unknown. In 2016, we administered an online survey to 912 donors and/or members of the Cornell Lab of Ornithology who self-identified as coffee drinkers and 'birdwatchers' to assess their familiarity with, receptivity to purchase, and perceived constraints on purchasing certified coffee.
3. Nearly half (49%) of respondents reported considering bird habitat when purchasing coffee. However, only 38% of respondents were familiar with the Smithsonian Bird Friendly® certification and only 9% reported purchasing it. Consumers who were older, female, and more skilled at birdwatching were more likely to consider birds when purchasing coffee, whereas those with higher levels of education were less likely. The highest rated constraints on buying bird-friendly coffee were lack of awareness, cost, and lack of availability.
4. Because most birdwatchers considered both social and environmental impacts when purchasing coffee, they may be a promising market segment for many coffee certifications. Indeed, about half of the birdwatchers purchased organic (50%) and Fair Trade® (52%) certifications.

5. Our results suggest that uptake of bird-friendly coffee may be strengthened by better communicating the impact of coffee production on bird habitat, the unique attributes of bird-friendly coffee (including the high-quality taste), differences among certification standards and credibility, and easy ways to find and purchase bird-friendly coffee.

KEYWORDS
bird-friendly coffee, birds, birdwatchers, coffee, conservation, shade-grown coffee

1 | INTRODUCTION

Prior to the 1970's, coffee was traditionally grown in many regions under a diverse canopy of mature trees. These 'shade-grown' coffee systems provided a wide range of ecosystem services including preventing soil erosion (Beer, 1987), increasing nutrients (Nesper et al., 2018), sequestering carbon (Palm et al., 2005), stabilizing microclimates (Pezzopane et al., 2011), and supporting biodiversity (Perfecto et al., 1996). Unfortunately, many of these shade-grown coffee systems have now been converted to low-shade or full-sun plantations in an effort to increase coffee yields (Jha et al., 2014). In Latin America, almost 50% of coffee plantations were converted to low-shade plantations from 1970 to 1990 (Perfecto et al., 1996). The percentage of land that was converted to low-shade plantations differed among countries, ranging from 15% in Mexico to more than 60% in Colombia (Perfecto et al., 1996). From 1990 to 2010, countries including Colombia, Costa Rica, El Salvador, Guatemala, and Nicaragua continued to decrease the percentage of total coffee production area used for traditional shade-grown coffee (Jha et al., 2014). By 2010, only an estimated 24% of the world's coffee was managed with traditional shade-grown practices compared to 43% in 1996 (Jha et al., 2014). The newer approach of 'sun coffee' farms are intensively managed and usually associated with high utilization of fertilizers and pesticides, which promote runoff, pollution of soil and water (de Jesús-Crespo et al., 2016; Rappole et al., 2003), and loss of habitat (Armbrecht, 2003).

The environmental consequences of the conversion from shade- to sun-grown coffee are especially pronounced given the spatial convergence of coffee cultivation and biodiversity hotspots (Hardner & Rice, 2002). Shade coffee systems provide critical habitat for a variety of species including ants, butterflies, birds, reptiles, bats, amphibians and small mammals, among others (Bakermans et al., 2009; Buechley et al., 2015; Jha et al., 2014; Moguel & Toledo, 1999; Pineda & Halffter, 2004). Specifically, shade-grown coffee systems can serve as a refuge for both resident and migratory bird species (Moguel & Toledo, 1999). Research in Latin America has shown that shade-grown coffee systems support high diversity and abundance of migratory birds comparable to or greater than forest habitat (Bakermans et al., 2009; Perfecto et al., 1996; Tejeda-Cruz & Sutherland, 2004; Wunderlee & Latta, 1996), although certain forest specialists or other sensitive species may be absent in shade-grown systems (Roberts et al., 2000; Tejeda-Cruz & Sutherland, 2004). Shade-grown coffee serves as important overwintering habitat for many Neotropical migrants including the Cerulean Warbler *Dendroica cerulea* (Bakermans et al., 2009) and Canada Warbler *Cardellina canadensis* (González et al., 2020). In some cases, the flora diversity in shade farms directly improves livelihoods of small-scale farmers through products like timber, firewood, and fruit that provide additional income flows and/or supplemental resources (Albertin & Nair, 2004; Hernandez-Aguilera et al., 2018; Jezeer & Verweij, 2015; Wartenberg et al., 2018). Moreover, shade-grown coffee constitutes a critical climate change adaptation strategy, one of the main challenges for the sustainability of the coffee industry (Ovalle-Rivera et al., 2015). An optimal level of trees reduces exposure to increasing temperatures and changing precipitation patterns, and positively affects soil health indicators (Blaser et al., 2018; Siebert, 2002).

Given the implications of coffee management systems to social and environmental factors, the coffee market has seen the development of a wide range of labels, seals, and certifications intended to capitalize on consumers' willingness to pay for pro-social and pro-environmental attributes. As the number of options available to consumers rises, so too does consumer confusion when making purchase decisions. Further, greenwashing, in which companies make unwarranted claims of the sustainability or environmental friendliness of their product or service (Dahl, 2010), has undermined consumer confidence and trust in green products (Chen & Chang, 2013; Delmas & Burbano, 2011), and increased confusion and perceived risk (Chen & Chang, 2013). Consumers usually cannot substantiate social and/or environmental claims themselves and, instead, must rely upon third-party certifications to ensure compliance with specific standards, practices, and on-farm environmental conditions. Certification programs are associated with some positive socio-economic outcomes (e.g. increased access to social networks, enhanced access to credit for producers, and increased farmer-training activities) and environmental outcomes (Bray & Neilson, 2017; DeFries et al., 2017; Tscharntke et al., 2015), but have been criticized for mixed effectiveness in achieving the goals expected by stakeholders (Bray & Neilson, 2017; DeFries et al., 2017; Oya et al., 2017). The efficacy of certifications is likely to depend on many factors including national regulatory context (Elder et al., 2013) and the value chain structures through which the certification programs are implemented (Bray & Neilson, 2017). More rigorous studies

are needed to better understand the impact of certifications (Oya et al., 2017). In this paper, we assume certification programs have the potential to contribute to conservation and livelihood benefits, and, therefore, it is worthwhile to understand whether and why people purchase certified coffee.

Certifications are particularly important for differentiating shade-grown coffee products because the term 'shade-grown' coffee can encompass a wide range of shade cover from 'traditional' or 'rustic' practices where coffee is planted beneath native forest, to shaded monocultures grown under scattered non-native trees (Moguel & Toledo, 1999; Philpott et al., 2008). Therefore, not all shade coffee farms offer the same conservation value (Calvo & Blake, 1998), yet it can all be marketed as 'shade-grown'. Following the decline in shade-grown coffee leading up to the 1990s, several certifications were established with specific criteria to ensure biodiversity goals were being met (Mas & Dietsch, 2004). Among the certifications were Rainforest Alliance®, which was first used for coffee in 1995, and Smithsonian Bird Friendly®, which was established in 1996 (Rice, 2008). The Smithsonian Bird Friendly® certification, developed by the Smithsonian Migratory Bird Center, aims to protect quality habitat for migratory birds and other wildlife (SMBC, 2020). It has the most stringent environmental requirements, which include organic certification and quality bird habitat (e.g. complex habitat structure, high shade, high plant diversity) (SMBC, 2020; see Table S1). Studies show that farms meeting Smithsonian Bird Friendly® criteria do, in fact, support higher levels of avian biodiversity than uncertified farms (Mas & Dietsch, 2004). More research is needed to segment markets to identify consumers whose interests may align with the priorities of the certifications and who would be willing to pay the price premiums required by certified coffee.

Nature enthusiasts and birdwatchers are commonly cited as target audiences of certified coffee but, to our knowledge, this potential has not been empirically examined (Muradian & Pelupessy, 2005). As a group, birdwatchers are already known to have high propensity to participate in conservation initiatives—either directly or indirectly through spending behaviour (Cooper et al., 2015; McFarlane & Boxall, 1996; Steven et al., 2017). Birdwatchers are more likely than non-recreationists and hunters to donate to local conservation efforts, join environmental groups, and support conservation policies (Cooper et al., 2015). Moreover, participation in conservation activities increases with birding specialization, a component of which is self-assessed skill-level (McFarlane & Boxall, 1996; Scott, 2013). Birdwatchers have also demonstrated a commitment to activities that they perceive to benefit birds, like bird feeding, despite the associated costs (Dayer et al., 2019). With over 45 million birdwatchers in the US alone, coupled with a US 40 billion dollar birdwatching and bird-feeding industry, birdwatchers could provide a strong and broad consumer base for shade-grown certified coffee (Carver, 2013; USDOI et al., 2018). Indeed, previous research by the Commission for Environmental Cooperation indicates that 17% of US respondents were 'very interested in purchasing' shade-grown coffee when the coffee description included protecting bird habitats (Commission for Environmental Cooperation, 1999). For birdwatchers specifically, it is not known the extent to which they may be willing to buy shade-grown and Smithsonian Bird Friendly® coffee (Hernandez-Aguilera et al., 2019).

Birdwatchers have not yet been studied with respect to what is preventing them from buying Smithsonian Bird Friendly® coffee, herein referred to as bird-friendly coffee. This is a necessary, yet often ignored step in assessing how they might be pursued as a target population for marketing efforts. Simply providing birdwatchers with more information about bird-friendly coffee may not be enough to change buying behaviour because knowledge and supportive attitudes alone are unlikely to drive behaviour change (McKenzie-Mohr, 2011). Approaches like community-based social marketing, in which the constraints (also called barriers) preventing change are identified and systemically removed (McKenzie-Mohr, 2000) have been shown to be successful in changing behaviour (e.g. Cole & Fieselman, 2013). To implement such strategies, we must first identify what specific constraints exist that prevent birdwatchers from purchasing bird-friendly coffee.

Constraints that prevent shade-grown and organic coffee sales have been documented, and bird-friendly coffee may be impacted by the same constraints as it has both an organic and shade requirement. One known constraint on shade-grown coffee sales is the perception of the taste—one of the most important factors influencing shade coffee consumption (Commission for Environmental Cooperation, 1999; Messer et al., 2000). Although shade-grown coffee is generally regarded as higher quality than sun-grown coffee (Muschler, 2001; Da Silva Neto et al., 2018) some consumers list the taste of shade-grown coffee as both a reason for and against purchasing it (Messer et al., 2000). Further, bird-friendly coffee sales may also be hindered by the common constraints on purchasing organic coffee certifications, including perceived inconvenience of purchasing the coffee and consumers' distrust of the coffee certifications and labels (Davies et al., 1995; Hughner et al., 2007; O'Donovan & McCarthy, 2002; Zanoli & Naspetti, 2002). Lack of awareness of bird-friendly coffee may also hinder sales (Messer et al., 2000).

This study assesses the awareness, purchasing behaviour, and perceived constraints on purchasing bird-friendly coffee among birdwatchers who are members and donors of the Cornell Lab of Ornithology, an organization that promotes understanding, enjoying, and conserving the natural world and birds. Specifically, we studied the following research questions:

1. To what extent are birdwatchers familiar with and purchasing certified coffee?
2. To what extent do birdwatchers report considering migratory bird habitat when purchasing coffee?
3. What characteristics of birdwatchers are associated with considering migratory bird habitat when purchasing coffee?
4. What constraints prevent or discourage consumers from considering migratory bird habitat when purchasing coffee?

2 | METHODS

Our online survey assessed coffee consumption and purchasing decisions of a random sample (n = 5,000) of over 37,000 members and donors of the Cornell Lab of Ornithology who receive the quarterly magazine, *Living Bird*. Participants had to be at least 18 years old and voluntarily agree to participate in the study after reading consent information; consent was provided through the online survey. This research was approved by the Cornell University Institutional Review Board (Protocol #1608006552).

2.1 | Sampling and survey implementation

We sent the online survey instrument (Dayer et al., 2021) to 5,000 people randomly selected from a list of *Living Bird* magazine recipients who had not opted out of email communications (n = 37,254). Specifically, the list of *Living Bird* magazine recipients consisted of people who opted to receive the magazine after either paying $44 dollars for a membership to the Cornell Lab of Ornithology or non-members who were offered the magazine subscription after donating at least $100. We conducted the survey through Qualtrics and sent the survey invitation on 8 September 2016. We then sent up to three reminders to non-respondents and partial respondents in weekly increments. The survey closed on 3 October 2016. We received 1,354 non-blank responses (27% response rate). We excluded 442 responses from participants who were not birdwatchers or did not drink coffee.

2.2 | Survey design

The survey examined respondents' coffee purchasing behaviours, preferences, factors that influence their coffee purchases, and demographics. Here we only describe the sections of the survey that are relevant to this study (Table 1; see Dayer et al., 2021 for full survey).

We measured familiarity with and purchasing of eight different coffee certifications commonly found in retail outlets: organic (USDA, 2020), Fair Trade Certified® (Fair Trade USA, 2020), Rainforest Alliance® (RA, 2020), Smithsonian Bird Friendly® (SMBC, 2020), Utz Certified® (Utz, 2020), 4 C Common Code® (4C Services GmbH, 2020), Nespresso AAA® (Nestlé Nespresso, 2020), and Starbucks C.A.F.E.® (SCS Global Services, 2020; Supporting Information). We asked respondents to rate their familiarity with each certification on a 5-point scale ranging from 'Not familiar at all' to 'Extremely familiar'. We also asked if respondents or anyone in their household currently purchased coffee with each certification.

To investigate the extent to which respondents considered migratory bird habitat when they purchased coffee, we included the following question in our survey: 'Do you consider "Conservation of habitat for migratory birds" a required product condition when purchasing coffee?'. This binary variable served as the dependent variable in investigating what characteristics of birdwatchers and other factors were associated with considering migratory bird habitat when purchasing coffee. We also asked if the respondent considered other coffee characteristics, growing practices, and production practices required when purchasing coffee for comparison in the same question (see Table 1).

We considered four demographic explanatory variables (age, gender, education, and birdwatching skill level) to assess what characteristics of respondents were associated with considering migratory bird habitat when purchasing coffee (Table 1).

In examining what factors serve as constraints on considering migratory bird habitat when purchasing coffee, we used another set of seven explanatory variables. We asked respondents to rate the extent to which a list of constraints impacted their decisions to buy bird-friendly coffee on a 5-point Likert-type scale ranging from 'Not very much' to 'Extremely'. We assessed external constraints (e.g. cost and availability) and internal constraints (e.g. lack of awareness). We also allowed respondents to write in their own constraints (Table 1).

We also included an open-ended question asking for 'additional comments about shade-grown coffee and any other general comments'.

2.3 | Analyses

We restricted the analysis to only include respondents who identified themselves as coffee drinkers and 'birdwatchers', resulting in 912 respondents. We used the question that asked respondents to rate their familiarity with each coffee certification to create a binary familiarity variable by combining the top four options ranging from 'Somewhat familiar' to 'Extremely familiar' into the 'Familiar' category (1) and included only the 'Not familiar at all' option as the 'Not familiar' category (0). We used descriptive statistics to report the percent of birdwatchers who were familiar with and purchased certified coffee and the percent of birdwatchers who consider migratory bird habitat when purchasing coffee.

Using logistic regression, we evaluated which birdwatcher characteristics and constraints on purchasing bird-friendly coffee were associated with considering conservation of migratory bird habitat required when purchasing coffee. We used the binary dependent variable indicating whether the respondent considered 'Conservation of habitat for migratory birds' a required coffee product condition (1 = 'Yes'). The independent variables were the four demographic variables and the importance ratings of constraints on buying bird-friendly coffee described above.

We supplemented this analysis with a qualitative analysis of the open-ended response questions. We inductively created a codebook that contained a comprehensive list of major themes present in the responses after reading all the responses. The lead author A.W. created the codebook and co-author A.D reviewed it. Then A.W. coded all the responses according to the codebook. Responses could include more than one theme.

TABLE 1 Survey items and response options for survey among Cornell Lab of Ornithology members or donors conducted on 8 September 2016 to 3 October 2016

Concept	Survey item	Measurement scale
Required coffee product attributes	Please select 'Yes' or 'No' for each item, to indicate if the characteristic is a required condition when you are purchasing coffee Higher quality in terms of sensorial characteristics such as flavour and aroma Environmentally friendly practices Conservation of habitat for migratory birds Chemical-free or organic production Safe and fair treatment of growers; support of their livelihoods	'Yes', 'No'
Certification familiarity	How familiar are you with each of the following types of certifications that endorse smallholder coffee growers? Organic Fair Trade Certified® Rainforest Alliance® Smithsonian Bird Friendly® Utz Certified® 4 C Common Code® Nespresso AAA® Starbucks C.A.F.E.®	5-point scale: 'Not at all familiar', 'Slightly familiar', 'Somewhat familiar', 'Moderately familiar', 'Extremely familiar'
Certification purchasing	Do you (or does anyone in your household) currently purchase any coffees with these certifications? Organic Fair Trade Certified® Rainforest Alliance® Smithsonian Bird Friendly® Utz Certified® 4 C Common Code® Nespresso AAA® Starbucks C.A.F.E.®	'Yes', 'No', 'I don't know'
Constraints on purchasing bird-friendly coffee	To what extent do the following items impact your decision about whether to buy bird-friendly coffee? Unaware of issues Cost It's not important to me Not willing to switch from my favourite coffee My coffee machine requires specific types of canisters (e.g. Keurig-type canisters) It's not for sale in my area (or where I shop) Other (please specify)	5-point scale: 0 = 'Not at all', 1 = 'Not very much', 2 = 'Somewhat', 3 = 'A moderate amount', 4 = 'Extremely'
Birding level	How would you describe your skill level at identifying birds across North America by sight? Please select the number that best describes your current skill level	9-point scale: 1 = 'Beginner (can identify less than 10 birds)', 2, 3 = 'Novice (can identify about 50 birds)', 4, 5 = 'Intermediate (can identify about 100 birds)', 6, 7 = 'Advanced (can identify any bird in my state or region)', 8, 9 = 'Expert (can identify most of North America's 700 birds'
Education	Please indicate the highest level of your educational attainment	'High school graduate', 'Some college', 'Associate and/or bachelor's degree', 'Bachelor's degree', 'Master's degree/professional degree', 'Doctorate'
Additional comments	And finally, if you have any additional comments about Shade Grown Coffee, or the survey in general, please feel free to use the space below	Open-ended

3 | RESULTS

Our sample of coffee-drinking birdwatchers (n = 912) was somewhat different from the US population of birdwatchers: they were more highly educated (55.4% attained a Master's/professional degree or Doctorate), older (mean age: 64.0 years old compared to a US birdwatcher average of 53 years old) and more female (67.2% compared to 56% of US birdwatchers; Carver, 2013). Our sample included a range of birdwatching skill level with 35.2% self-identified as somewhere between a beginner and novice, 48.9% identified as having intermediate skills, and 15.6% as advanced to expert levels.

3.1 | Familiarity with and purchase of coffee certifications

As shown in Figure 1, respondents were the most familiar with coffee labelled as organic, Fair Trade Certified®, and Rainforest Alliance®. They were moderately familiar with Smithsonian Bird Friendly® and Starbucks C.A.F.E.®. Respondents showed low familiarity with Utz Certified®, Nespresso AAA®, 4 C Common Code®. Similarly, the highest proportion of respondents indicated they currently purchase Fair Trade Certified® and organic. A moderate proportion indicated they purchased Rainforest Alliance®, Starbucks C.A.F.E.® and Smithsonian Bird Friendly®. The lowest proportion purchased Nespresso AAA®, Utz Certified® and 4 C Common Code®.

3.2 | Extent of birdwatchers considering bird habitat in coffee purchases

The most desirable product attribute for respondent birdwatchers was 'Higher quality in terms of sensorial characteristics such as flavour and aroma' (67.5%). About half of all respondents also required 'Environmentally friendly practices', 'Conservation of habitat for migratory birds' and 'Safe and fair treatment of growers; support of their livelihoods'. 'Chemical-free or organic production' was a required attribute for 41.3% of respondents (Figure 2).

3.3 | Characteristics of birdwatchers who consider migratory bird habitat in coffee purchases

In the logistic regression analysis predicting conservation of migratory bird habitat as a required coffee attribute, we found the model to be significant ($\chi^2_{15} = 89.5$, $p < 0.001$; Figure 3). Women were more likely than men to consider conservation of migratory bird habitat a required coffee attribute (OR: 1.49). The odds of requiring conservation of bird habitat was 2.96 times higher for those with a high school diploma/ some college compared to those with a Master's/professional degree or Doctorate, and 1.52 times higher for those with a Bachelors and/or associates degree. The odds of requiring conservation of bird habitat increased with age, increasing by a factor of 1.02 for every year. The effect of birdwatching skill was not straightforward and differed depending on willingness to switch away from a favourite coffee. For those who were willing to switch, the odds of requiring conservation of bird habitat

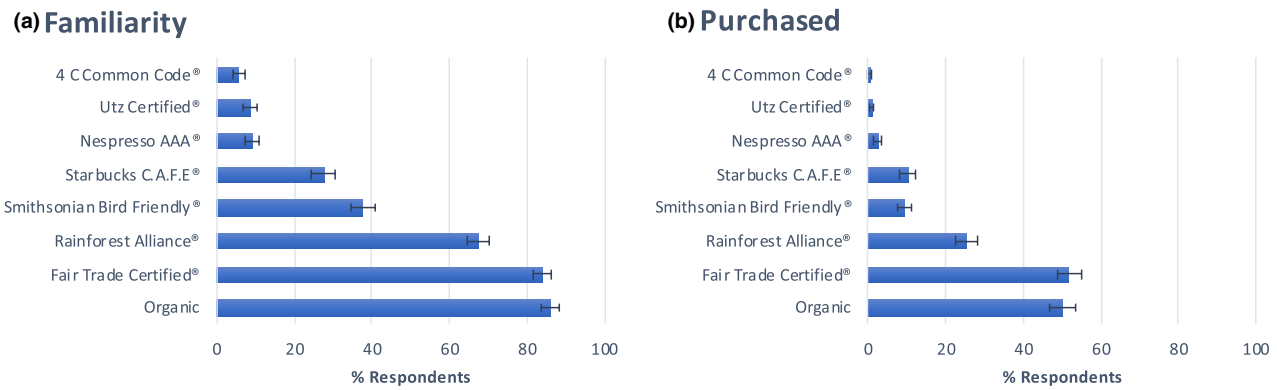


FIGURE 1 Percent of respondents who were (a) familiar with and (b) purchased each type of coffee certification from a survey of Cornell Lab of Ornithology members and donors who self-identify as coffee-drinking birdwatchers ($n = 912$) conducted on 8 September 2016 to 3 October 2016

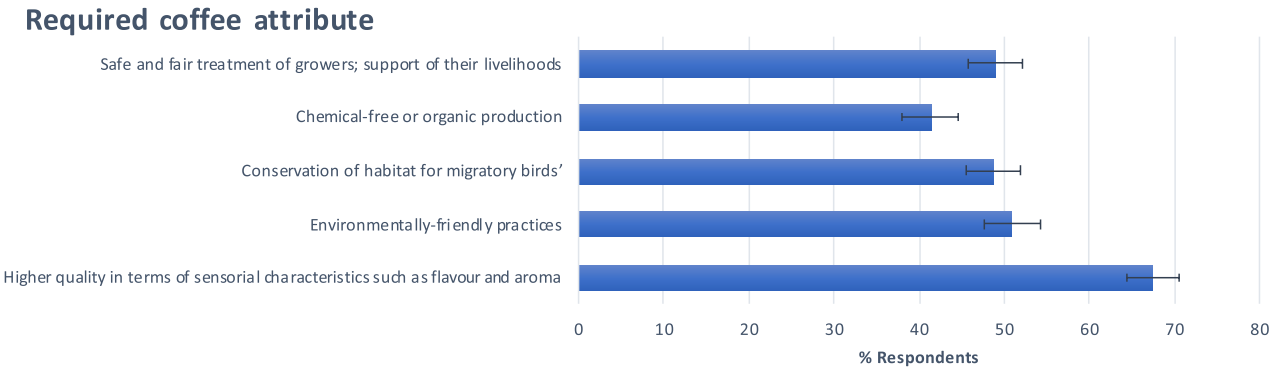
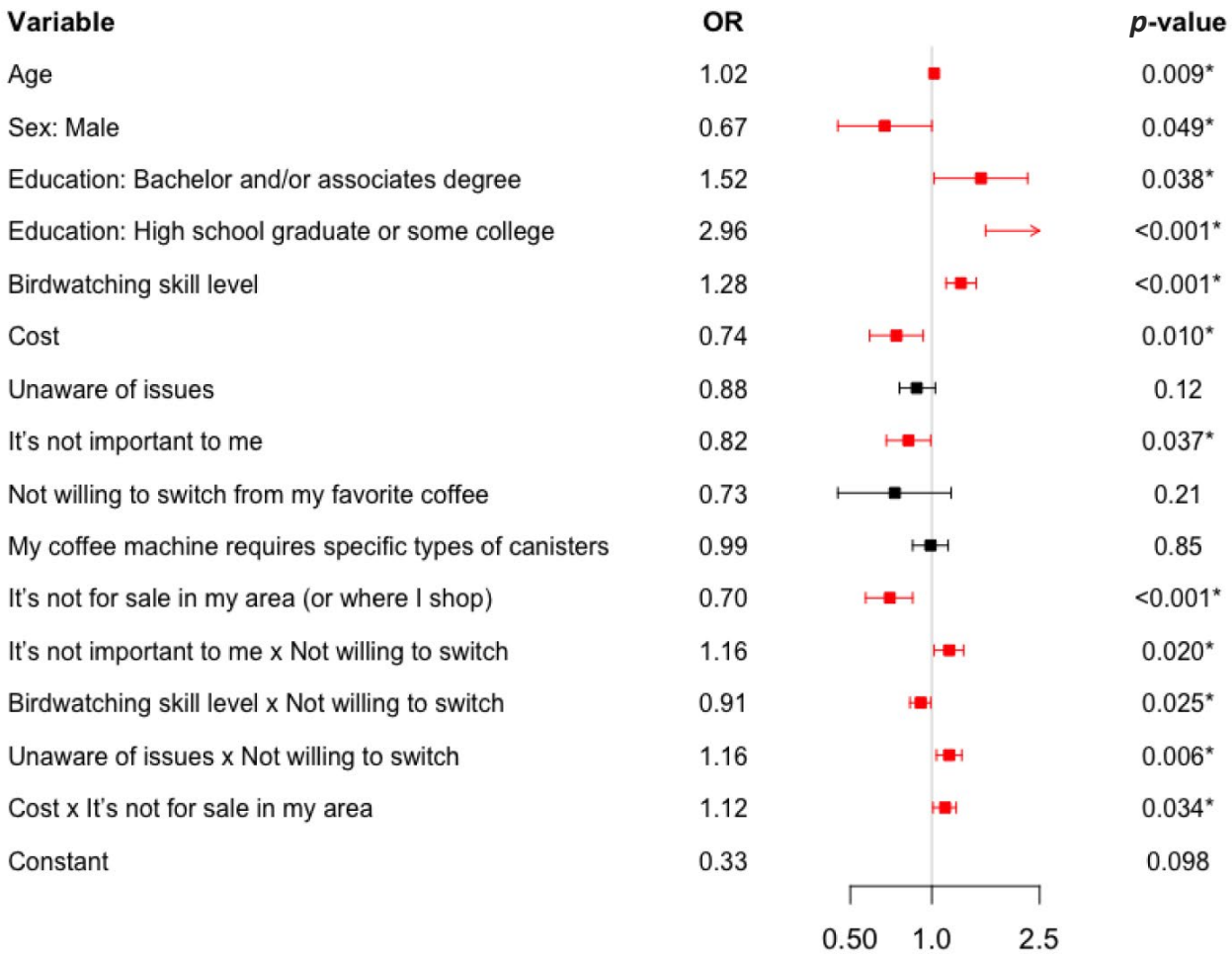


FIGURE 2 Percent of respondents who consider each coffee attribute to be a required product condition when purchasing coffee from a survey of Cornell Lab of Ornithology members and donors who self-identify as coffee-drinking birdwatchers ($n = 912$) conducted on 8 September 2016 to 3 October 2016



Cox & Snell R^2: 0.14, Nagelkerke R^2: 0.19, OR: Odds ratio, * < 0.05,
Birdwatching skill level measured on a scale from 1 to 9 [1 = Beginner (can identify less than 10 birds), 9 = Expert (can identify most of North America's 700 birds)]
Education reference level: Master's/professional degree or Doctorate
Barrier ratings measured on a scale from 0 to 4 [0 = Not at all, 4 = Extremely]
Conducted using R, version 3.6.2 (R Core Team, Vienna, Austria).

FIGURE 3 Logistic regression predicting selection of yes (1) or no (0) to the question 'Is "conservation of habitat for migratory birds" a required product condition when you are purchasing coffee?' among Cornell Lab of Ornithology members or donors who self-identify as coffee-drinking birdwatchers and provided responses to all questions for this analysis ($n = 590$) from the survey conducted on 8 September 2016 to 3 October 2016

increased by a factor of 1.28 for every one-point increase in skill level (Figure 3).

3.4 | Constraints on considering migratory bird habitat in coffee purchases

The highest-rated constraints on purchasing bird-friendly coffee, were 'Unaware of issues', 'Cost', 'It's not for sale in my area' and 'Other'. All of the average ratings for these constraints fell between 'Not very much' and 'Somewhat' important in the decision about whether to buy bird-friendly coffee. We also found evidence of interactions between constraints (Figure 3). For those extremely unwilling to switch coffee, the odds of requiring conservation of bird habitat as a coffee attribute increased with lack of awareness, rising by a factor of 1.61 for every one-point increase in 'Unaware of issues'. For those willing to switch coffee, the odds of requiring conservation of bird habitat increased by a factor 1.22 for every one-point decrease in 'It's not important to me'. For those not impacted by cost, the odds of requiring conservation of bird habitat increased with availability, rising by a factor of 1.43 for every one-point decrease in the rating of 'It's not for sale in my area'. The remaining attribute 'My coffee machine requires specific types of canisters (e.g. Keurig-type canisters)' was not significant.

We received 132 responses to the 'Other: please specify' open-ended option in the question asking respondents what factors were important in their decision to buy bird-friendly coffee. Fifty-nine respondents added new ideas to the pre-existing list of survey options, while the others fell within the response options we provided or were a complaint about the survey or question. Of the responses that did not fall within the provided options, the two most common themes were taste/type of coffee was important in coffee purchasing decisions ($n = 8$) and lack of knowledge of which coffee or brands were bird-friendly ($n = 8$).

Additionally, in the final 'other comments' section at the end of the survey, the most common theme was a lack of knowledge about issues surrounding bird-friendly and certified coffee ($n = 51$ out of 189 valid responses). Specific issues raised in these responses were not knowing what bird-friendly coffee and/or coffee certifications are ($n = 14$). Some individuals were unaware that coffee had an impact on birds and/or bird habitat ($n = 14$). Other comments mentioned lack of availability ($n = 36$), taste ($n = 17$), and label scepticism ($n = 10$).

4 | DISCUSSION

Sustainable coffee certifications are market-driven mechanisms designed to incentivize ethical and environmental standards for coffee production. These certifications require marketing to consumers who desire the resulting ethically and environmentally friendly produced coffee and who are willing to pay price premiums associated with certified coffee. Birdwatchers may be an obvious target audience for bird-friendly coffee because of their pro-conservation behaviours (Steven et al., 2017), interest in birds, and relatively high income (Carver, 2013) but their purchasing behaviour has yet to be studied. In our study, 9% of respondents reported they purchased Smithsonian Bird-Friendly® coffee. This is somewhat higher than the results from an international survey with primarily US respondents (98%), which found only 3.8% of respondents have consumed bird-friendly coffee before (Delmas & Clements, 2017). This was despite a greater portion of our respondents (61%) being unfamiliar with bird-friendly coffee compared to the 50% who reported having no understanding of bird-friendly coffee in Delmas and Clements (2017). Although higher than the sample from the US public, 9% is still low compared to the proportion of our respondents who buy more well-known certifications like organic (50%) and Fair Trade Certified® (52%). However, nearly half (49%) of our respondent birdwatchers reported that conserving migratory bird habitat was a required attribute when purchasing coffee. Thus the percentage of respondents who require conserving bird habitat was substantially higher than those who actually purchase bird-friendly, and we speculate this gap may be due to some respondents believing, perhaps incorrectly, that other certified coffee or coffee products they buy conserve migratory bird habitat. For example, one respondent wrote, 'I assume that when I buy organic, fair trade coffee it is good for the environment which is also good for birds'. It is also likely that some respondents interpreted the question to ask whether or not they would want conservation of migratory bird habitat as a coffee attribute, but do not purchase bird-friendly coffee or understand the link between bird-friendly coffee certification and conservation of bird habitat. Either way, there may be a subset of birdwatchers who would be willing to purchase coffee that conserves migratory bird habitat but do not yet purchase certified bird-friendly coffee. Compared with a previous study that found 17% of US general public were willing to buy coffee that protected bird habitat (Commission for Environmental Cooperation, 1999), our finding that 49% of birdwatchers consider conservation of migratory bird habitat a required product condition is encouraging. Indeed, if roughly one half of the current population of birdwatchers in the US were purchasing bird-friendly coffee, there would be nearly 23 million birdwatchers buying bird-friendly coffee (Carver, 2013). However, 23 million birdwatchers are not purchasing bird-friendly coffee as it remains a niche market and more popular certifications, like Rainforest Alliance®, only command around 5.6% of the market share (Newsom & Milder, 2018). Our sample of birdwatchers was somewhat different from the US population of birdwatchers: they were more highly educated, older and more female. These differences between our sample and the US birdwatching population may have contributed to our optimistic results.

Our results indicate that the concerns of birdwatchers extend beyond birds. Compared to other product attributes, the percentage of respondents for which conserving bird habitat was a required coffee attribute was similar to those the requiring 'environmentally friendly practices' (51%). In line with this finding, birdwatchers tend to exhibit more pro-environmental behaviour than non-recreationists (Cooper et al., 2015); and past research has shown birdwatching is associated with other pro-environmental behaviours (Nord et al., 1998). Likewise, the percentage of respondents demanding bird-friendly practices was similar to the attribute 'safe and fair treatment of growers' (49%), though greater than 'chemical-free or organic production' (41%).

Birdwatchers were most familiar with the more popular certifications like organic (86%) and Fair Trade Certified® (84%) and purchased them at the highest rates (Fair Trade Certified®: 52%; organic: 50.0%). This is consistent with Steven et al., 2017 which found that birders value conservation broadly, beyond bird conservation alone. Thus, birdwatchers may also be an ideal target for a wider range of certified coffee beyond those with bird-related missions.

We found three trends illustrating that certain consumers are more likely than others to purchase certified coffee (Loureiro & Lotade, 2005). First, females were more likely than males to consider conservation of migratory bird habitat a required coffee attribute. Past research also showed females to be more likely to buy shade-grown coffee (Loureiro & Lotade, 2005) and more likely to engage in daily environmentally friendly behaviour (Tindall et al., 2003). This is important considering women are more likely than their male counterparts to have the primary responsibility to shop for groceries in the household (Flagg et al., 2014). Second, we found a positive relationship between age and requiring conservation of migratory bird habitat as a coffee product attribute. Previous research shows

a positive relationship between age and ecologically conscious consumer behaviour (e.g. Roberts, 1996); however, there has not been consistent pattern in other literature between age and green buying behaviours (Fisher et al., 2012). For those with a willingness to switch from their favourite coffee, the higher the birdwatching skill level, the more likely they were to require the attribute 'conservation of migratory bird habitat' when purchasing coffee, although this trend was not significant for those who were more unwilling to switch. This finding aligns with research showing more specialized birders are more likely to engage in conservation activities than less specialized birders (McFarlane & Boxall, 1996; Scott, 2013). However, some coffee consumers may be unwilling to transition away from their preferred coffee (De Pelsmacker et al., 2005) and in the groups of birdwatchers who are unwilling to give up their favourite coffee, this positive trend with birdwatching skill may not hold. Our results suggest that it may be possible to target particular subsets of birdwatchers (e.g. older women who are more skilled birdwatchers) who appear more likely to be receptive to buying bird-friendly coffee.

Our results suggest a negative relationship between educational degree level and requiring conservation of migratory bird habitat as a coffee attribute. This contradicts past research that found higher levels of education to be associated with pro-environmental behaviour (Meyer, 2015) and purchasing organic food (Bellows et al., 2008). However, other research has not found a consistent relationship between education and green consumerism (Kirmani & Khan, 2016) and a negative relationship between education and environmental concern (Samdahl & Robertson, 1989). Other studies have found a negative relationship between education and preference for eco-labelled food (Johnston et al., 2001), or no relationship (Wessels et al., 1999). Likewise, our results suggest that formal education may not necessarily be associated with green consumerism. Informal education sources and strategies to reach and educate consumers may be important regardless of educational background.

Taste is likely to be one of the most important factors in the decision to purchase certified coffee as it is for organic food (Hernandez-Aguilera et al., 2018; Magnusson et al., 2001). A greater number of respondents considered high-quality sensorial characteristics required coffee product attributes compared to conservation of migratory bird habitat. This corroborates with past research on Fair Trade coffee, finding that flavour was slightly more important than the certification in coffee purchasing decisions (Sörqvist et al., 2013). Respondents also reflected on the importance of taste in the open-ended response section. One respondent wrote, 'It would help if there were objective taste ratings of such coffee available… Taste is important'. The perception of certified coffee's taste could prove to be an obstacle for sales. Further, more information about the Fair Trade initiative itself may worsen the participants' expectations of the taste of the coffee slightly (Murphy & Jenner-Leuthart, 2011). However, some people also perceive coffee labelled 'eco-friendly' to have a better taste compared to a non-labelled alternative (Sörqvist et al., 2013). We suggest the high-quality taste of bird-friendly coffee may be an important attribute to stress when marketing bird-friendly coffee.

Product information and awareness are important prerequisites for ethical consumption (Tallontire et al., 2001) and are also important in bird-friendly coffee purchases. Lack of awareness was one of the highest rated constraints on purchasing bird-friendly coffee. However, the effect of awareness was influenced by willingness to switch from a favourite coffee. Among those who were unwilling to switch from their favourite coffee, less awareness of the issues surrounding bird-friendly coffee was associated with considering conservation of migratory bird habitat required. In other words, those who had a greater awareness of the issues yet were unwilling to switch may be less likely to buy bird-friendly coffee. In our qualitative analysis, one constraint we identified was confusion over what bird-friendly coffee was, as one respondent explained, 'I had no idea there was even such a thing as bird-friendly coffee'. Several expressed confusion over coffee certifications more broadly, including not knowing coffee certifications existed, and not being aware that there were so many. Accordingly, respondents had low familiarity with many of the coffee certifications. Nearly two-thirds of our respondents indicated they were not familiar at all with Smithsonian Bird-Friendly® coffee. Low familiarity with certifications extended beyond just bird-friendly coffee to Utz Certified®, 4 C Common Code®, and Nespresso AAA®. For each of these certifications, more than 90% of respondents were unfamiliar. There may be a need to increase familiarity with the bird-friendly certification to increase sales. Other themes we identified were the lack of awareness of the impact coffee has on birds and bird habitat. One respondent wrote they were 'ignorant of the link between drinking my favourite morning drink … and the impact upon the birds in doing so'. From other organic food research contexts, there is evidence that providing information about the label can increase the amount consumers are willing to pay for the product (Rousseau & Vranken, 2013). Our results indicate it may be useful to target the lack of awareness of bird-friendly coffee, certifications, and the impact coffee production has on birds to increase birdwatchers' desire to purchase it.

Lack of availability, which is a well-documented constraint on organic food sales (Davies et al., 1995; Hughner et al., 2007; O'Donovan & McCarthy, 2002; Zanoli & Naspetti, 2002) was also a constraint for our respondents. Respondents rated 'It's not for sale in my area (or where I shop)' as one of the factors that most influenced their decision of whether or not to buy bird-friendly coffee. However, the importance of lack of availability as a constraint was moderated by cost. The interrelated nature of lack of availability and cost was reflected in our qualitative analysis, where several respondents expressed frustration with the high shipping costs that would be required to ship bird-friendly coffee to their location. For those who were less impacted by cost, the higher they rated 'It's not for sale in my area', the less likely they were to consider conservation of migratory bird habitat a required coffee attribute. This suggests that individuals who do not see cost as a constraint may be less likely to buy bird-friendly coffee the more they are challenged by the lack of close and convenient places to buy bird-friendly coffee. Our finding aligns with

research on organic food that found consumers value convenience and do not want to spend a lot of effort in purchasing food (Padel & Foster, 2005). Lack of availability was reflected anecdotally as the second most common theme found in our qualitative analysis. Many of the responses indicated bird-friendly/shade-grown coffee was not available or hard to find in their area and several stated they would buy the coffee if it were more available. This suggests that for our respondents, lack of availability and inconvenience of finding the product are important constraints on sales. These results point to a need for better distribution channels and advertisement of bird-friendly coffee.

Future research could investigate avitourists, tourists whose motivation to travel is based on birdwatching, as targets for bird-friendly coffee. Avitoursits are more likely to participate in conservation activities (Hvenegaard & Dearden, 1998), and willing to pay the high costs associated with travel and equipment (Hvenegaard et al., 1989; Moldonado et al., 2018), placing them among the wealthiest nature-based tourists (Sekercioglu, 2002; Steven et al., 2014). Avitourists from the US frequently take birdwatching trips to Latin American countries including Costa Rica, Mexico, and Ecuador, where coffee production practices impact many species of migratory and endemic birds (Maldonado et al., 2018). Marketing campaigns directed at avitourists from the US could capitalize on their interest in the birds found in these Latin American countries and highlight the potential benefit of shade-grown coffee production on species of interest.

Our study has some limitations to note. Our open-ended sections were optional, and the number of individuals who responded to these sections was relatively small. Therefore, the frequency of responses did not give us a sense of proportion of the whole sample who shared the thoughts written in, although the insights were helpful in interpreting our quantitative results. To improve upon our study, we recommend assessing a wider range of constraints including taste and distrust of labels, which we were only able to capture through the open-ended responses. We also did not assess income level, which may have aided our understanding of purchasing behaviours and moderated the impact of other constraints. Further, this survey was dependent on voluntary participation (27% response rate) and is subject to non-response bias. The recruitment email for the survey asked for participation to help researchers 'identify strategies to improve sustainable agriculture, support coffee-growing communities, and conserve bird habitat'. Those who responded may have had a greater interest in these areas compared to those who chose not to respond, although this may not necessarily translate into a greater interest in purchasing certified coffee. Lastly, our sample of birdwatchers were drawn from Cornell Lab of Ornithology members and donors. All respondents either paid a $44 membership fee or donated over $100 to the Cornell Lab of Ornithology and may generally have enough income to budget for green/sustainable food premiums. Accordingly, they may not represent the average birdwatcher in the US and our results may over-represent the ability to purchase bird-friendly coffee. Still, they come from a large population of birdwatchers nearly 40,000 individuals internationally and they represented a wide range of birdwatching specialization. We recommend that future research explore this topic with other samples of birdwatchers, such as visitors to birding festivals or people who feed birds in their backyards.

5 | CONCLUSION

Our results indicate that it may be possible to target specific consumer segments which would be more willing to purchase certified coffee. In particular, birdwatchers have the potential to be an appropriate target for bird-friendly coffee sales. Further, more skilled birders may be more likely to view conservation of migratory bird habitat as a required product attribute when they purchase coffee. Companies selling bird-friendly coffee could target a more skilled birding audience to increase sales, however, current market instruments are insufficient to reach this target population.

We found birdwatchers lack knowledge in several key content areas, which may be relevant for future education and marketing campaigns. Birdwatchers would benefit from a better understanding of what coffee certifications are, what bird-friendly coffee is, and the impact coffee production has on migratory bird habitat. It may also be beneficial to share information on the credibility of the certification programs like Smithsonian Bird Friendly® and Rainforest Alliance® to increase trust of these certifications. Educating birdwatchers in the ways that bird-friendly coffee certifications help to conserve bird habitat and support biodiversity may help alleviate the scepticism of some consumers.

Our results suggest it may also be necessary to move beyond education alone to address other constraints on bird-friendly coffee sales. In particular, a major constraint on sales is the perceived or actual lack of availability of bird-friendly coffee products. It may be useful to advertise bird-friendly coffee in birding magazines, websites, or social media pages with clear links for purchasing, which could be a way to reduce the perception that it is difficult to find bird-friendly coffee and minimize the effort required for purchase. There may also exist an underlying need for wider availability of bird-friendly coffee that education alone cannot address. Findings from our research about this high demand among birdwatchers might be useful in convincing coffee suppliers (such as grocery stores) to sell bird-friendly coffee.

Many birdwatchers in our study expressed that they would buy bird-friendly coffee if they liked the taste of the coffee. Bird-friendly coffee roasters and suppliers could target birdwatchers through bird organization meetings and bird watching events, festivals or conferences, providing free samples to help introduce these birdwatchers to bird-friendly coffee. As taste preference is highly individual and important in coffee purchasing decisions, this may provide birdwatchers with the opportunity to find coffee they like and would purchase. In addition, high quality and specialty coffee events and stakeholders (e.g. Specialty Coffee Association) can contribute to increasing awareness about the potential link between high-quality, shade-grown coffee and bird conservation. In line with social marketing techniques, addressing constraints on connecting birdwatchers with bird-friendly coffee is essential to promoting bird-friendly

coffee sales and ultimately facilitating the environmental benefits of shade-grown coffee.

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CONFLICT OF INTEREST

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AUTHORS' CONTRIBUTIONS

All authors conceptualized the study. A.A.D., J.N.H.-A., T.P., H.F.-G., M.I.G., and A.D.R. designed the survey; H.F.-G. and T.P. administered the survey; A.W. analysed the data with support from A.A.D., and A.W. and A.A.D. led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

DATA AVAILABILITY STATEMENT

Our de-identified survey data are archived with VTechData, the data repository for Virginia Tech, https://doi.org/10.7294/BQB2-4D82 (Dayer et al., 2021).

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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