Do Colored Photographs Affect Willingness to Pay Responses for Endangered Species Conservation?

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Abstract   The NOAA panel suggested that use of photographs should be pre-tested to explore their effects on subjects (Arrow et al. 1993). For this paper, a modification to the test suggested by the NOAA Panel was made. We tested whether use of colored, as opposed to black and white (B & W), photographs influence respondents' valuation of the environmental commodity in question. The context of the test is a CVM study valuing the benefits from protecting the national bird. This was performed using two drop-off surveys that were identical except for the color of the photographs incorporated in the survey instrument. The dichotomous choice logit equations were statistically different between the two treatments of the questionnaire, indicating the significant effect of colored photographs on the respondents' WTP. The findings support the NOAA Panel recommendation of careful pre-testing and scrutiny of the photographs integrated in the questionnaire since 'packaging' of the environmental good (i.e., endangered species protection) matters in valuing benefits associated with it. Since colored photographs are found to be value-enhancing, to simply use B & W photos as an attempt to reduce cost associated with implementing the contingent valuation (CV) survey, especially when limited research money is involved, would result to lower the estimated value of the environmental good.

Keywords   Colored photographs · Contingent valuation · Philippine eagle · Willingness to pay

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1 Introduction

Visual presentation of information is widely recognized in the fields of market research and psychology. It enhances 'evaluability' or the extent to which individuals can affectively assimilate a piece of information so that they respond in a way that reflects their true preference (Bateman et al. 2006). Psychological studies have shown that visual presentation leads to a correct evaluation of factual outcomes (MacGregor and Slovic 1986), in the accuracy of comprehending risk (Lipkus and Hollands 1999), and in minimizing judgment and perception errors as compared with numeric information (Bateman et al. 2006; Fagerlin et al. 2005; Zikmund-Fisher et al. 2005).

In the past decades, the use of visuals also found its way to non-market studies (i.e., choice experiments, contingent valuation (CV), etc); visuals have been used also to reduce the uncertainty and unfamiliarity of the good being valued. However, varying ways of conveying information through visuals can substantially create different impacts in the way respondents interpret and perceive certain matters.

Using a split sample choice experiment, Bateman et al. (2006) studied how best to convey a land use change scenario by contrasting numeric information with virtual reality (VR) visualizations, and a combination of both. Results indicate that the conventional numeric format has roughly twice gain/loss asymmetry compared with visual presentations. In other words, the use of certain numeric information alone have increased dependence upon the loss aversion heuristic and resulted in increasingly anomalous results. Similarly, visual applications have also been extended to mortality risk reduction studies, which use communication tool devices. Loomis and duVair (1993) and Corso et al. (2001) showed that willingness to pay (WTP) values of alternative risk communication devices (e.g., graph paper, risk ladder with logarithmic presentation) vary significantly with the magnitude of risk reduction. This led them to conclude that the use of appropriate methods of communicating risk variations leads to valid WTP estimates.

However, one aspect of visual presentation that has not received adequate attention in non-market studies is the use of colored photos. This is despite the recommendations made by the National Oceanic and Atmospheric Administration (NOAA) Panel that this be subjected to scrutiny and pilot testing to avoid the use of misleading photographs. A lone study by Shyamsundar and Kramer (1996), for instance, led them to drop visual aids from the survey instrument because of the respondents' undesirable reactions to the photographs.

In experimental psychology, there are mixed findings on whether colors aid in cognitive recall. Results of a study by Wichmann et al. (2002) showed that participants recalled colored natural scenes better than black and white (B & W) images, regardless of the time spent in assessing both type of pictures. Falsely colored natural scenes, however, did not fare better than B & W pictures. This implies that it is not color per se that strengthens memory but rather natural color. The result affirms a study by Joseph and Proffitt (1996), in which they concluded that stored color knowledge was more influential in object recognition than surface color. However, an opposing result is forwarded by Anglin and Levie (1985) in that enhancements of B & W photographs such as shading, detail, and color did not increase the likelihood of memory recall.

In this paper, we conducted a split sample survey to examine whether the use of colored, as opposed to B & W, photographs affects the household-respondents' willingness to support an enhanced Philippine Eagle Conservation program, and consequently, their WTP amount. This is particularly important in the context of a developing country, where research money is scant and where the use of B&W photographs can be viewed as an attempt to reduce survey cost. Results show that the estimated WTP values for questionnaires with colored photos

are significantly higher than WTP values for questionnaires with B&W photos, implying the value enhancing effect of the former.

The remainder of the paper is organized as follows: Sect. 2 presents the hypothesis of the study together with the statistical techniques employed; Sect. 3 reports the survey data used and the procedure for calibrating WTP responses; Sect. 4 analyzes the data collected and presents the results of the hypothesis test; and Sect. 5 gives the study's conclusions.

2 Hypothesis

The referendum question, or dichotomous choice (DC), format was used to elicit the WTP of respondents. This technique, also known as take-it-or-leave-it, presents respondents with the opportunity to vote on a referendum. The nature of this question satisfies the requirements for incentive compatibility and the recommendation made by the NOAA panel (Arrow et al. 1993). Although individuals do not directly state their value, the variation in dollar amounts that they are asked to pay allows the statistical analysis of their responses using a binary logit/probit model (Bishop and Haberlein 1979; Hanemann 1984). The binary logit approach gives the basic relationship:

$$\text{Prob (Yes)} = 1 - \{1 + \exp[B_0 - B_1(\$X)]\}^{-1}$$

where B's are coefficients and $X is the dollar amount the household is asked to pay. From the above equation, Hanemann (1989) provides a formula to calculate the expected value of WTP as:

$$\text{Mean WTP} = 1/B_1 * \left(\ln \left(1 + \exp \left(B_0 + \sum (B_n(Z_n)) \right) \right) \right).$$

This study is particularly interested in evaluating the impact of colored photographs on the estimated WTP for the increased protection of the Philippine Eagles, the country's national bird. The null and alternative hypotheses for the split samples are:

$$H_o : E(WTP_{colored}) = E(WTP_{black\ \&\ white})$$
$$H_a : E(WTP_{colored}) \neq E(WTP_{black\ \&\ white})$$

where $WTP_{colored}$ refers to the survey instrument with colored photographs and $WTP_{black\ and\ white}$ with B&W photos. Given a DC elicitation format, two null hypothesis tests can be made. First is to test if the mean WTP is statistically different across survey versions. This can be supplemented with a comparison of confidence intervals around the means (Park et al. 1991). Second, one can compare the valuation behaviors in the two survey instruments by comparing the equality of coefficients in the logit equations. A multivariate equivalent of the null hypothesis in the equation is expressed as:

$$H_o : B_{o(colored)} = B_{0\ (black\ and\ white)};$$
$$B_{1\ (colored)} = B_{1\ (black\ and\ white)};$$
$$\ldots B_{n\ (colored)} = B_{n\ (black\ and\ white)}.$$

This study employed the likelihood ratio test that compares the value of the log likelihood function when the data are pooled across survey versions (i.e., restricted to equality of coefficients) versus the individual survey estimates (i.e., coefficients unrestricted). If the behavior elicited is the same regardless of the variation in photographs presentation, then there is no significant difference between the pooled likelihood value and the sum of the two unrestricted

log-likelihood values (Greene 1990). The likelihood ratio test, as shown below, is twice the difference in the pooled log likelihood value and the sum of the individual log likelihood values:

$$\lambda = 2 \left(LL_{pooled} - (LL_1 + LL_2) \right)$$

where LL is the outcome of the log-likelihood function. The test statistic is distributed at chi-square with degrees of freedom equal to the sum of the number of coefficients in the restricted model.

3 Data and Survey Design

In August and September 2005, a split sample survey using questionnaires with B&W and colored photos[1] was carried out in the Davao Region, Southern Philippines, particularly in: Davao City, Tagum City, and Digos City.[2] Data were collected using the drop off technique,[3] which gives respondents ample time to think (Whittington et al. 1992) and elicits WTP responses based on household decision. Ethical protocols[4] in administering the CV surveys were closely followed in the study. Roughly one out of 10 households approached refused to participate in the survey. Of those who agreed to participate, two out of 10 did not return or complete the questionnaire. All in all, out of the total 532 questionnaires distributed, 402 were usable, indicating a 76% response rate.

3.1 Valuation Scenario

Except for variations in photograph presentation (colored versus B&W), the same amount of information was contained in the survey forms to allow for evaluation of differences in the reported WTP. The study, however, did not test for the difference between with and without photographs.

The respondents were asked to value the increased protection of the Philippine Eagle through a Comprehensive Mindanao Philippine Eagle Conservation Program. This Program will put under protection 4.3 million hectares (or almost 80%) of forest areas in Mindanao instead of just the 300,000 ha covered by the current conservation program. Conservation activities will include habitat/forest protection, in-situ breeding activities, conservation education program, and community-based with livelihood component protection initiatives. Under this hypothetical scenario, a Management Group composed of the Philippine Eagle Foundation (PEF), in consortium with the Department of Environment and Natural Resources (DENR), the local government units (LGUs), the business sector and some nongovernment organizations (NGOs), will be created. All these efforts are expected to increase the survival rate of the Philippine Eagle from "fair" to "good".

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[1] Photographs of six endangered species in the world as well as the program components (i.e., captive breeding, field research, community-based initiative, and conservation education) were incorporated in the survey form, with one set using colored photographs and the other set using B&W versions.

[2] These are the three largest cities in the Davao Region. These cities were stratified into villages of different income classes following the National Statistics Office (NSO) classification. Respondents were randomly selected from these groups.

[3] This was supplemented by personal interviews whenever necessary (to probe non-response and missing items).

[4] This includes asking the respondents' consent, incorporating a confidentiality clause in the questionnaire, and explaining thoroughly the purpose of the survey. At the end of the survey, the respondents were further informed that different households received different bid amounts.

The CV question was phrased in the following manner, "Would you *vote* to support the Conservation Program to protect the Philippine Eagle and its habitat if it will cost your household a fixed monthly payment of Php___to be added to your water bill over the next 5 years[5]?"

Under the hypothetical scenario, an Eagle Trust Fund will be established to receive contributions from Filipino households. However, the provision rule states that the Management Group and the Eagle Trust Fund will only be created if the Comprehensive Eagle Conservation Program gets the majority vote (60%) of the people. Once this majority vote is obtained, every household will be made to pay the agreed amount. It was also stipulated in the scenario that a Law will be passed to ensure that all contributions to the Philippine Eagle Trust Fund will be solely spent to support the various Philippine Eagle Conservation activities.

Carson and Groves (2007) argued that incentive and informational properties of preference questions (i.e., binary discrete choice question) should be given careful consideration. In order to determine incentive and informational properties, they require careful attention to the type of the good being offered, to the nature of payment obligation, and to other aspects of the context in which the good is offered. The public good nature of the proposed Philippine Eagle Conservation Program and the 'coercive' or mandatory payment scheme satisfy the incentive compatibility requirement put forward by Carson and Groves (2007).

Cheap talks added to the script to reduce hypothetical biases (Samnaliev et al. 2006; Cummings and Taylor 1999) were stated in the following manner.

> "Past studies have found that many people say YES to a referendum in support of a proposed Program when they are asked of their opinion in a survey, but they would vote NO when faced with the actual situation. In other words, respondents seem to have a tendency to say they would Vote for the referendum even if they do not really mean it."

> "Researchers are not sure why people do this. It may be because it feels good to say yes in a survey when people do not actually have to pay. Or it could be to please the person dropping off the survey. Try to tell us how you would answer in an actual situation. Please say yes ONLY if you are really willing to support the Conservation Program."

3.2 Data Calibration

In the study, 'no responses' were screened for protest votes and were removed from the data as they are assumed to be non-indicative of the respondents' 'true' values (Jorgensen et al. 1999). As a general rule, reasons other than financial constraint and the good having no value to the respondent were considered protest responses. These include reasons such as dislike on the payment vehicle and mistrust on the implementer/management groups and the government due to corruption. From 402 survey forms (uncensored data), 344 questionnaires were retained after protest screening (Table 2). These were further subjected to certainty calibration to correct for potential hypothetical bias (Ready and Navrud 1999; Champ et al. 1997; Ekstrand and Loomis 1998). A common application of the certainty scale is to treat positive answers as 'yes' only when certainty levels are at least 8 on a 10-point scale with 10 indicating 'very certain' (Champ et al. 1997). So far, however, there is no established agreement on the appropriate certainty question (Samnaliev et al. 2006). In this study, the follow-up

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[5] Five focus group discussions and two on-site/off-site pilot surveys led to the final choice of water bill as the payment vehicle. These consultations also allowed the researchers to come up with five plausible bid amounts: Php5, Php10, Php30, Php50, and Php100 (1USD=Php50).

Table 1 Comparison of socio-demographic characteristics of respondents

Variable	Uncensored			Censored		
	Colored ($n = 188$) Mean	Black & White ($n = 214$) Mean	t-test	Colored ($n = 161$) Mean	Black & White ($n = 183$) Mean	t-test
Age (years)	43.79 (11.09)	45.7 (13.21)	-1.5567	43.41 (11.28)	45.33 (13.67)	-1.4078
Education (years)	11.1 (2.91)	11.96 (2.81)	-3.013***	11.13 (2.72)	11.66 (2.78)	-1.7828
Size of HH	5.33 (2.41)	5.42 (2.58)	-0.344	5.31 (2.47)	5.48 (2.72)	-0.5634
HH income earner	1.7 (.87)	2.01 (1.15)	-3.0665***	1.69 (.87)	1.99 (1.18)	-2.6564***
HH income (Php)	8654.93 (9235.91)	9998.15 (9978.22)	-1.3942	8444.88 (9162.94)	9289.43 (9329.08)	-0.8448

Note: ***significant at 1%; HH—household
Figures in parenthesis are standard errors

certainty question was framed as, "How certain are you that you would vote "yes"/"no" if such a referendum would really take place?" The choices are completely sure, sort of sure, not so sure, and not sure at all.[6] Those who responded 'yes' to the referendum question but are either 'not so sure' or 'not sure at all' were reclassified as 'no'[7]. Distribution of WTP responses to the follow-up certainty question is shown in Appendix 1. The final data set after protest screening and certainty adjustments is herein referred to as the censored data.

4 Results and Discussion

4.1 Socio-economic Profile

Except for the average number of household income earners, no significant differences in socio-economic profile were found between B&W and colored respondents in the censored data set (Table 1). The same is observed for the uncensored data set, with the addition of education, which was significant at 1%.[8]

On knowledge and familiarity questions, chi-square test results affirmed the differences between sub samples and across data sets (Table 2). For both data sets, a higher percentage of respondents in the colored sample have seen a live Philippine Eagle compared with respondents in the B&W sample. Also, respondents in the censored and colored sample (92%) exhibited greater knowledge of the Philippine Eagle being a national bird than those who received questionnaires with B&W photos (84%). For the uncensored data set, a significant number of colored respondents knew that the Philippine Eagle was named after the Vice President of the Philippines.

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[6] Follow-up certainty question was initially framed by the authors as an answer to hypothetical bias usually observed in a CV study. After the pretest, the team agreed to use four options so as not to limit the options available to respondents (i.e., using only 'completely sure' and 'not sure at all' options).

[7] During the pretest, it was also revealed based on the feedback by respondents that a 'sort of sure' response in the follow-up certainty question is as good as a 'completely sure' response. Although they used a different approach, Champ et al. (1997) recognized such flexibility. In their study, where a 10-point certainty scale following a DC format was used, the cut-off point was 8 (with 10 being very certain). Such technique has been shown to provide similar hypothetical and actual WTP (Champ et al. 1997).

[8] Based on the χ^2 test performed, the removal of protest votes did not significantly alter the socio-economic characteristics of the respondents.

However, there is no significant difference in the respondents' attitudinal and behavioral characteristics. In general, 96% exhibited a belief in the bequest value (i.e., it is everyone's duty to ensure the survival of plants and animals for future generation) and 79% on the existence value (i.e., endangered species are important even if I do not see or interact with them) of endangered species. Both groups, however, are not willing to match their preference with cash donations or favoring an increase in tax to support the conservation program.

4.2 WTP Responses

Table 3 presents the number of respondents who voted 'yes' and 'no' per bid level for both uncensored and censored data sets. In general, 'yes' responses declined with increasing bid amounts, conforming to theoretical expectations.

For the uncensored data set, 36% and 25% agree to support the program in the colored and B&W version, respectively. Due to protest screening and certainty adjustment, the percentage of 'yes' response was reduced to 33% (colored version) and 24% (B&W version). The major reasons for voting 'yes' to the program include beliefs that: (a) the Philippine Eagle as a national bird ought to be protected (75%); (b) the program could successfully protect the Philippine Eagle (51%); and (c) the conservation effort will lead to more initiatives that will protect other endangered species in the country (49%).

Overall, the study revealed that environmental conservation (i.e., endangered species protection) is a low priority concern in the country, which supports the findings of other CV studies conducted in the Philippines (e.g., Choe et al. 1996; Lauria et al. 1999). The major reasons of those who voted 'no' to the proposed conservation program are income constraint (63%) and fear that the majority of the poor will be affected once the program is implemented (42%). Protest against the payment vehicle was also noted.

4.3 Acceptability of CV Scenario

It is also imperative to know if respondents believe in the hypothetical nature of the CV scenario. We include questions regarding the acceptability of the description of the good and the credibility of the hypothetical scenario that we presented. The results reveal that majority (73%) of the respondents believe in the description presented in the questionnaire regarding the endangered status of the Philippine Eagle. Also, about 74% of all respondents held the belief that the proposed conservation program can really save the Philippines Eagles. With respect to the best organization to manage the program, 70% believe that PEF is fit to spearhead the program.

4.4 Hypothesis Testing Results

A likelihood ratio test was performed for both uncensored and censored data to detect if differences only occur due to calibration of WTP responses and elimination of protest responses. To account for potential effects of socio-economic factors, variables such as age, gender, and income were included in the logit model in addition to the bid amount. As expected, the bid amount and household income were found to significantly affect the respondents' WTP for the Program.

As indicated in Table 4, using the censored data, the calculated χ^2 (9.55), is higher than the critical value (9.49), at 5% level. In effect, both uncensored and censored data sets show significant difference at 5% level between colored and B&W samples. The estimated mean WTP for the colored photograph sample (Php31 per month) is 48% higher than the mean WTP

Table 2 Familiarity and knowledge questions about the Philippine Eagle

Familiarity and knowledge question	Uncensored			Censored		
	Colored (n = 188)	Black & White (n = 214)	χ²	Colored (n = 161)	Black & White (n = 183)	χ²
Have seen live Phil. Eagle	87	81	3.02*	87	79	3.59*
Believe that Phil. Eagle is threatened	62	66	0.943	63	95	0.196
Aware that Phil eagle is our national bird	89	83	2.16	92	84	5.42**
First captive bred eagle is Pag-asa	81	81	0.0127	84	80	0.956
An eagle was named after Vice Pres Noli De Castro	84	78	6.56***	85	80	1.41

Note: ***, **, and * Significant at 1%, 5%, and 10% respectively. All numbers are in percent except for χ² columns

Table 3 Distribution of respondents' willing to support the Philippine Eagle Conservation Program

Bid Amount (Php)	Uncensored						Protest votes excluded						Protest votes excluded and corrected for certainty (Censored)					
	Colored		Black & White		All		Colored		Black & White		All		Colored		Black & White		All	
	n	%Yes	n	%Yes	n	%Yes	n	%Yes	n	%Yes	n	%Yes	n	%Yes	n	%Yes	n	%Yes
5	36	61	41	56	77	58	33	67	38	61	71	63	33	58	38	50	71	54
10	40	50	38	32	78	41	33	61	31	39	64	50	33	42	31	29	64	36
30	36	42	48	19	84	29	29	52	40	23	69	35	29	38	40	23	69	29
50	38	13	44	14	82	13	32	16	40	15	72	15	32	13	40	8	72	10
100	38	13	43	9	81	11	34	15	34	12	68	13	34	15	34	12	68	13
Total	188	36	214	25	402	30	161	42	183	30	344	35	161	33	183	24	344	28
χ²	5.15**								5.51**								3.33*	

Note: n = no. of respondents; ** and *significant at 5% and 10%, respectively. Critical χ² at 10% is 2.706

for the B&W group (Php21 per month). A similar pattern is observed using the uncensored data, with a 30% mean WTP difference in favor of the colored photograph sample.

The basic implication of the results is that 'packaging' of the environmental good is a critical aspect in any CV survey. This is similar to findings in market research studies (e.g., Alfnes et al. 2006; Jordan et al. 1990) where a change in labels (e.g., color, style) affects consumers' perception of the good. The idea of 'evaluability' also raises an important explanation on the use of visual representation as opposed to numeric information. It is argued that unless individuals attach with and recognize a piece of information on an emotional 'affective' stage, then that information will be meaningless (Bateman et al. 2006, 2007). In the present case, the use of colored photographs could have facilitated the way respondents' digest and understand information leading them to reveal their underlying preferences.

4.5 Pooled Data Analysis

The data were pooled to further evaluate if indeed colored photographs influence WTP responses and to determine other factors that affect the likelihood of contributing to the Program. A dummy variable for the questionnaire version was included in the model as well as behavioral and attitudinal factors, which a priori increase the probability of agreeing to the referendum question.

As shown in Table 5, the multivariate results coincide with initial results that colored photographs have a significant impact on the WTP for the proposed Philippine Eagle Conservation Program. VERSION, referring to the dummy variable of the photograph presentation, has a significant and positive influence on WTP at 1% level. Consistent with theoretical grounds, the bid amount and income significantly affect WTP in opposing direction. With a higher bid amount, respondents are less likely to support the program. In contrast, the higher the household income, the greater is the probability that an individual will agree to pay.

In addition, the data show that those who believe in the 'endangered status' of the Philippine eagle (DESC) tend to support the program. In the same way, respondents who trust the capability of the collecting agency (PAYVE) are more likely to give for the Conservation Program. These results validate the fact that the information provided to respondents and the acceptability of various components of the contingent scenario are important in designing a CV survey. The familiarity (i.e., if respondent has seen live Philippine Eagle) and knowledge (i.e., if respondent knows that Philippine Eagle is the national bird) of respondents were also included in the multivariate analysis. These were found to have an insignificant effect on the probability of respondents paying for the proposed Conservation Program. While it is possible that familiarity and experience with the good affects the respondents' WTP, they do not have some bearing on the incentive properties of question format in the context in which it is being employed (Carson et al. 2000).

The variable THINK, referring to respondents' thinking about Philippine Eagle prior to the survey, has a positive and significant effect on the probability of respondents supporting the proposed initiative. Both the uncensored and censored regression models are statistically significant at 1% with 25% and 23% R-squared, respectively. Other variables such as AGE, GENDER, and PRIOSP were found to be insignificant.

5 Conclusions

We evaluated the effects of colored, as opposed to B&W, photographs on respondents' WTP for the protection of the Philippine Eagle to determine if it matters in CV survey. This is a

Table 4 Hypothesis testing results based on likelihood ratio test, with covariates

Independent variable	Description	Uncensored			Censored		
		Colored ($n = 188$)	Black & White ($n = 214$)	Pooled ($n = 402$)	Colored ($n = 161$)	Black & White ($n = 183$)	Pooled ($n = 344$)
Bid	Bid amount	−0.0271671***	−0.0269278***	−0.0268248***	−0.0216676***	−0.0236356***	−0.0222948***
		(0.006411)	(0.0068284)	(0.0045961)	(0.0065499)	(0.0074355)	(0.0048339)
Age	Age of respondent	−0.035173**	0.0044594	−0.014565	−0.0327534*	0.0161452	−0.0061322
		(0.0158649)	(0.0130006)	(0.0097856)	(0.0169701)	(0.0137263)	(0.0102784)
Gender	1 = male; 0 = female	0.2216256	−0.236355	0.0433024	0.1788229	−0.1237884	0.1029633
		(0.3504735)	(0.3678694)	(0.2478176)	(0.3818148)	(0.4036002)	(0.2711607)
Income	Household income (in Php)	0.0000459**	0.000027*	0.0000311***	0.0000482**	0.000031*	0.0000364***
		(0.0000204)	(0.0000155)	(0.0000117)	(0.0000219)	(0.0000175)	(0.0000131)
Constant		1.349364*	−0.6238715	0.3636321	0.9385054	−1.409724**	−0.3096592
		(0.7204716)	(0.6289704)	(0.4576595)	(0.7677118)	(0.677624)	(0.4859252)
R^2		0.1553	0.1075	0.1197	0.1323	0.1011	0.1006
Log likelihood		−103.42969	−107.88856	−216.46866	−88.516936	−90.738766	−184.03194
Critical χ^2 at 5% (4)			9.48773			9.48773	
Likelihood ratio statistic			10.30082**			9.55247**	

Note: ***, **, and * are significant at 1%, 5%, and 10%, respectively. Figures in parenthesis are standard errors

Table 5 Multivariate model testing the significance of the questionnaire version, pooled data

Independent variable	Description	Coefficient	
		Uncensored	Censored
BID	Bid amount	−0.0298924***	−0.02458***
		(0.0050059)	(0.0052175)
AGE	Age of respondents	−0.0039325	0.0000534
		(0.0108727)	(0.0114273)
GENDER	1 = male; 0 = female	−0.0095907	0.0657744
		(0.2903324)	(0.3140283)
HHY	Monthly household income (in Php)	0.0000317**	0.0000304**
		(0.0000141)	(0.0000152)
THINK	Respondent has thought of PE prior to the survey (1 = yes; 0 = otherwise)	0.5850803*	0.7188297**
		(0.3213447)	(0.3541806)
PAYVE	Believe in the capability of the collecting agency (1 = yes; 0 = otherwise)	1.172315***	1.120418***
		(0.283877)	(0.309235)
PRIOSP	Believe that endangered species protection (ESP) should be a top priority (1 = yes; 0 = otherwise)	0.4796543	0.2503544
		(0.4315109)	(0.43945)
DESC	Believe in the description on the status of the PE (1 = yes; 0 = otherwise)	1.478863***	1.754394***
		(0.3929984)	(0.4815622)
VERSION	Questionnaire version (1 = colored; 0 = black and white)	0.8620029***	0.8012337***
		(0.282294)	(0.3049466)
LPE	Respondent has seen live PE (1 = yes; 0 = otherwise)	−0.1319606	−0.1340732
		(0.3972895)	(0.4339592)
ENB	Respondent knows that PE is the national bird (1 = yes; 0 = otherwise)	−0.2638649	−0.2505678
		(0.4107659)	(0.4717842)
CONS	Constant	−2.313391***	−3.112171***
		(0.793308)	(0.8840355)
Log likelihood		−170.31468	−147.90687
LR χ^2 (11)		112.37	88.8
Prob > χ		0	0
Pseudo R^2		0.2481	0.2309

Note: ***, **, and *are significant at 1%, 5%, and 10%, respectively

Figures in parenthesis are standard errors

variation to the NOAA panel recommendation regarding pretesting the use of photographs before using them in a CV study. We wanted to find out if colored presentation matters as well in the use of photographs in CV studies. The two versions of the survey questionnaire, differing only in photograph presentation (i.e., colored versus B&W), yielded significantly different logit equations and WTP estimates. The multivariate logit regression further substantiates this result, leading to the conclusion that the use of colored photographs matters and tends to have value-adding effect on WTP for the environmental good.

The study showed that photograph presentation does influence respondents' valuation of the environmental good exemplified by the proposed Philippine Eagle Conservation Program. This indicates that presentation of the survey instrument, especially when it involves leaving the questionnaire for respondents to answer as required in a drop-off survey technique, is a critical component of the survey instrument. Our results show that colored photographs positively influenced the overall perception of respondents on the good being valued, translating to higher WTP for the good in question. One possible explanation to this stems from the concept of 'evaluability'—this having been proposed as "a mechanism mediating the role of

affect[9] in decision process" (Bateman et al. 2007). The fundamental nature of 'evaluability' is that *affect* conveys meaning upon information; and in the absence of *affect*, information become meaningless and do not form part of the individuals' decision making process (Bateman et al. 2006, 2007). It could thus be argued that the presence of colored photographs enhances respondents' ability to assimilate information, which is a critical component to reveal one's true preference.

What this implies further is that use of colored photographs can enhance efforts to raise funds for environmental causes like endangered species conservation, either by influencing the respondents to better appreciate the value of the good in question or making them pay closer attention to the conservation scenario being presented to them.

The NOAA Panel (Arrow et al. 1993) cautioned however, that '… this technique [use of photographs] is a two-edged sword because the dramatic nature of a photograph may have much more emotional impact than the rest of the questionnaire …'. Shyamsundar and Kramer (1996) mentioned that photographs attracted so much attention and excitement that they were detrimental to the survey process. The present study was not able to look into this aspect as it did not include a without photograph group. Future research on this subject may consider including the with and without photographs and use of colored and B&W photographs to shed more light on the discussions on the use of visuals in survey designs.

Appendix 1   Distribution of WTP responses to the follow-up certainty question[a]

Valuation answer	Certainty responses				Total
	Completely sure	Sort of sure	Not so sure	Not sure at all	
Colored					
Yes	27(40)	26(39)	12(18)	2(3)	67(42)
No	20(21)	22(23)	32(34)	17(18)	94(58)
Black and white					
Yes	28(52)	16(30)	30(56)	6(11)	54(30)
No	28(22)	25(19)	41(32)	31(24)	129(70)
ALL					
Yes	55(45)	42(35)	19(16)	5(4)	121(35)
No	55(25)	47(21)	73(33)	48(22)	223(65)

[a] Certainty calibration was done after protest responses were removed from the sample. Figures in parenthesis are percentages

[9] As cited by Bateman et al. (2007), Slovic et al. (2002) used the term *affect* to refer to experienced feeling states associated with positive or negative qualities of a stimulus.

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