

Title:

Intentions of Landowners towards Active Management of Ecosystem in South-central USA for Deer Habitat Management

Authorship:

(Given Name Middle Name (Optional) Family Name, each author separated by commas).

Bijesh Mishra (विजेश मिश्र)^a, Omkar Joshi^a, Binod P. Chapagain^{ab}, Lixia He Lambert^c, Rodney E. Will^a

Affiliations:

^a Department of Natural Resource Ecology and Management, Oklahoma State University, Stillwater, OK, 74078

^b Department of Integrated Biology, Oklahoma State University, Stillwater, OK, 74078

^c Department of Agricultural Economics, Oklahoma State University, Stillwater, OK, 74078

Corresponding Author:

Bijesh Mishra:

Email: Bijesh.mishra@okstate.edu; bjs.misra@gmail.com

Mailing address: 008C Agriculture Hall (212 N Monroe Street, 008C), Stillwater, OK, 74078

Table 1: Validity of structural variables, descriptions, and descriptive statistics of measurement variables.

Measurement Variables in SEM Models	Factor loading (Std. Err.)	Mean (St. Dev.)
Subjective Norms (<i>SN</i>): Cronbach Alpha (α) = 0.89		
<i>e1value</i> : Sustainable management of forest, rangeland and deer habitat is important to the people I value most.	0.76 (0.05)	3.82 (1.08)
<i>e1diverse</i> : My family and friends think that forest, rangeland, and deer habitat management could enhance plant and animal diversity.	0.82 (0.04)	3.60 (1.14)
<i>e1support</i> : My family and friends are supportive of forest, rangeland, and deer habitat management activities.	0.90 (0.02)	3.82 (1.04)
<i>e1livable</i> : My family and friends think that forest, rangeland, and deer habitat management would make our environment more livable.	0.81 (0.05)	3.57 (1.12)
Perceived Behavior Controls (<i>PBC</i>): Cronbach Alpha (α) = 0.48		

<i>e1resource</i> : I have resource and opportunities to manage my land for forest, rangeland, and deer habitat management.	0.48 (0.09)	3.49 (1.16)
<i>e1improve</i> : I think that I can improve forest, rangeland, and deer habitat on my property by actively managing them.	0.68 (0.10)	3.95 (0.98)

Moral Norms (*MRL*): Cronbach Alpha (α) = 0.82

<i>e2respect</i> : I give respect and courtesy to people who are involved in forest, rangeland, and deer habitat management.	0.71 (0.05)	4.24 (0.86)
<i>e2maintain</i> : I feel that I should actively manage forest, rangeland, and deer habitat on my property to maintain deer habitat for deer and wildlife.	0.90 (0.03)	3.95 (1.00)
<i>e2invest</i> : I feel honored to invest money, time, and resources to manage forest, rangeland and deer habitat for deer and wildlife habitat.	0.77 (0.04)	3.58 (1.18)

Attitudes (*ATT*): Cronbach Alpha (α) = 0.87

<i>e3manage</i> : I am satisfied with the overall characteristics of forest, rangeland, and deer habitat that I maintain.	0.67 (0.06)	3.65 (0.96)
---	----------------	----------------

<i>e3effort</i> : I am satisfied with the number of deer and wildlife that I observed with the management effort that I put in my property.	0.83 (0.04)	3.72 (1.06)
<i>e3wilder</i> : I am satisfied with the wilderness of forest, rangeland, and deer habitat that I maintain.	0.88 (0.03)	3.66 (1.00)
<i>e3overall</i> : I am satisfied with the overall benefits I am getting from forest, rangeland, and deer habitat that I manage.	0.77 (0.05)	3.58 (1.04)

Intentions (*INT*): Cronbach Alpha (α) = 0.44

<i>a7wtp</i> : Assume that you do not observe any deer in your regular hunting site.	0.66	61.51
How many dollars/acres are you willing to spend to maintain the deer population you generally observe in that site to receive desired hunting experience? (USD)	(0.08)	(106.37)
<i>a9altdist</i> : If you could not go to the site that you regularly hunt deer, how far would you drive one way to go to another deer hunting site of about the same quality? (miles)	0.54 (0.09)	20.25 (27.90)

<i>c6interest:</i> Are you interested in knowing more about active forest or	0.37	0.60
rangeland management in Oklahoma?	(0.07)	(0.49)

Table 2: Distribution of landowners' responses to observed variables used in SEM models.

Constructs	Variables	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
SN	<i>e1value</i>	4.85	6.06	22.42	35.76	30.91
SN	<i>e1diverse</i>	7.27	7.88	24.85	37.58	22.42
SN	<i>e1support</i>	2.42	10.30	18.79	40.00	28.48
SN	<i>e1livable</i>	6.06	10.30	26.06	35.76	21.82
PBC	<i>e1resource</i>	6.67	14.55	22.42	36.36	20.00
PBC	<i>e1improve</i>	3.03	4.85	17.58	43.03	31.52
MRL	<i>e2respect</i>	3.03	0.00	9.70	44.24	43.03
MRL	<i>e2maintain</i>	3.03	2.42	26.06	32.73	35.76
MRL	<i>e2invest</i>	6.06	10.30	31.52	24.24	27.88
ATT	<i>e3manage</i>	1.83	12.12	21.21	48.48	16.36
ATT	<i>e3effort</i>	3.64	11.52	16.97	44.85	23.03
ATT	<i>e3wilder</i>	3.03	10.30	23.64	44.24	18.79
ATT	<i>e3overall</i>	4.85	9.70	25.45	42.42	17.58

Note: Variables are defined in table 1.

Table 3: SEM Model fit statistics for all four models along with the sample size used in each model.

Fit Statistics\Models	TRA	TRA-moral	TPB	TPB-moral
Model vs. saturated (MS) Likelihood ratio test: (χ^2):	43.89	85.87	72.44	121.72
Baseline vs. saturated (BS) Likelihood ratio test: (χ^2):	823.04 ***	1212.59 ***	937.14 ***	1333.33 ***
Satorra-Bentler scaled test (MS) (χ^2):	30.361	63.76	52.00	91.88
Satorra-Bentler scaled test (BS) (χ^2):	612.77 ***	932.48 ***	709.53 ***	1034.54 ***
Root mean squared error of approximation (RMSEA):	0.02	0.04	0.04	0.04
RMSEA lower Bound:	0.00	0.00	0.00	0.01
RMSEA Upper Bound:	0.06	0.06	0.06	0.06
P-close (Probability RMSEA \leq 0.05):	0.88	0.81	0.76	0.74
Satorra Bentler RMSEA (SB RMSEA):	0.00	0.00	0.00	0.00
Comparative Fit Index (CFI):	1.00	0.99	0.98	0.98
Satorra Bentler CFI(SB CFI):	1.00	1.00	1.00	1.00
Tucker Lewis Index (TLI):	1.00	0.98	0.98	0.97
Satorra Bentler Tucker-Lewis index (SB TLI):	1.03	1.01	1.02	1.00
Standardized root mean squared residuals (SRMR):	0.04	0.41	0.05	0.05
Coefficient of determination (CD):	0.99	0.99	0.99	0.99
Akaike's information criterion (AIC):	4187.33	5280.93	5108.11	6177.32

Table 4: Standardized Setorra-Bentler coefficients of four SEM models (TRA, TRA-moral, TPB, and TPB-moral).

Structural Variables	TRA Coeff. (Std. Err.)	TRA-moral Coef. (Std. Err.)	TPB Coef. (Std. Err.)	TPB-moral Coef. (Std. Err.)
<i>SN → INT</i>	0.46 *** (0.097)	- 0.16 (0.21)	0.23 (0.20)	- 0.17 (0.20)
<i>ATT → INT</i>	- 0.21 * (0.12)	- 0.31 ** (0.11)	- 0.36 ** (0.16)	- 0.33 *** (0.12)
<i>MRL → INT</i>	-	0.84 *** (0.26)	-	0.80 *** (0.30)
<i>PBC → INT</i>	-	-	0.42 (0.28)	0.07 (0.22)
<i>SN → MRL</i>	-	0.75 *** (0.05)	-	0.52 *** (0.14)
<i>ATT → MRL</i>	-	0.12 (0.08)	-	-
<i>PBC → MRL</i>	-	-	-	0.39 ** (0.16)

Note: β -Coef. = Standardized correlation coefficients (StataCorp, 2017), Std. Err. = Satorra-Bentler robust standard error of coefficients. *SN → INT*: subjective norms (*SN*) impact Intentions (*INT*) and so on. All arrows in the table are in accordance with arrows in respective models. Dashes (-) indicate irrelevant variable in the model. *** = $p < 0.001$, ** = $p < 0.05$ and * = $p < 0.10$

Table 5: Standardized correlation coefficients of latent variables in four SEM models (TRA, TRA-moral, TPB, and TPB-moral)

Components of Theories	TRA	TRA-moral	TPB	TPB-moral
	Coef. (Std. Er.)	Coef. (Std. Er.)	Coef. (Std. Er.)	Coef. (Std. Er.)
<i>SN*ATT</i>	0.40 *** (0.09)	0.40 *** (0.09)	0.40 *** (0.09)	0.40 *** (0.09)
<i>SN*PBC</i>	-	-	0.71 *** (0.11)	0.69 *** (0.10)
<i>PBC*ATT</i>	-	-	0.59 *** (0.10)	0.56 *** (0.09)
Note: SN*ATT: Standardized correlation coefficient (StataCorp, 2017) between subjective norms (SN) and attitudes (ATT). Dashes (-) are irrelevant in the model. *** = $p < 0.001$, ** = $p < 0.05$ and * = $p < 0.10$.				

Additional Material:

Table 6: Distribution of landowners' responses to variables presented in same section of survey but not included in SEM.

Variables	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
<i>e1govt</i> : It would be difficult to conduct forest, rangeland, and deer habitat management without government support.	21.82	22.42	22.42	18.18	15.15
<i>e1commun</i> : It would be difficult to conduct forest, rangeland, and deer habitat management without support from the community.	27.27	20.61	27.88	20.00	4.24

<i>e2harvest</i> : Excessive harvesting of natural resource may limit their use for the future generation.	7.27	3.03	13.94	33.94	41.82
<i>e3benefit</i> : Active Forest, rangeland, and deer habitat can bring economic as well as environmental benefits.	4.24	6.67	15.76	42.42	30.91
<i>e3human</i> : The primary use of forest, rangeland, and deer habitat management should be to benefit human beings.	8.48	16.36	26.06	32.12	16.97
<i>e3restrict</i> : Restricting excessive use of forest, rangeland, and deer habitat can enhance recreational opportunities.	8.48	15.15	33.33	27.27	15.76
<i>e3time</i> : It is important to spend time managing forest, rangeland, and deer habitat.	2.42	3.64	23.64	38.18	32.12
<i>e3balance</i> : Sustainable management of forest, rangeland, and deer habitat is important to maintain balance and diversity in the natural environment.	3.03	3.64	17.58	40.61	35.15
<i>e3connect</i> : I feel connected with nature when I get involved in forest, rangeland, and deer habitat management.	3.03	4.24	24.24	37.58	30.91

<i>e3environ</i> : The primary use of forest, rangeland, and deer habitat management should be to benefit the environment.	4.85	7.88	34.55	33.33	19.39
<i>e3noneed</i> : There is no need for active, forest, rangeland, and deer habitat management.	45.45	30.91	15.76	3.03	4.85
