

*Public Knowledge and Perceptions of
the Desert Tortoise*

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Objectives

Examine relationship between *knowledge* of the Desert Tortoise and:

- Demographics
- Perceive threats to populations
- Acceptability of management actions
- Support for efforts to recover the desert tortoise
- Attitudes and norms toward desert tortoises
- Willingness to limit desert-related activities



Methods

- Mail and Telephone surveys
 $n = 1,011$
response rate = 53%



- Responses weighted by Census data
 - County Sex
 - Ethnicity Age
- California residents in 5 counties
 - Imperial Los Angeles San Bernardino
 - Kern Riverside

Objective Knowledge (True / False)

- The desert tortoise is the California State Reptile (T)
- Desert tortoises hibernate from October through February (T)
- Desert tortoises may live up to 100 years or longer (F)
- Adult desert tortoises are typically longer than 20 inches (T)
- Tortoises spend only a small percent of their time in burrows (F)
- Desert tortoises do not need water to survive (T)
- Tortoises eat mainly plants such as grasses and flowers (T)
- Summer can kill an unsheltered desert tortoise in an hour (T)
- Tortoises build up most of their fat & water reserves during spring (T)
- Tortoises may be active any time of the year following a rainfall (T)

Results



Ten knowledge questions:

- 0 – 2 correct = Low Knowledge
- 3 – 5 correct = Middle Knowledge
- 6 – 8 correct = High Knowledge

| Knowledge | n | % |
|-----------|-----|----|
| Low | 314 | 34 |
| Middle | 406 | 44 |
| High | 200 | 22 |

| Knowledge of Desert Tortoise | % Correct | | |
|-------------------------------------|-----------|--------|------|
| | Low | Middle | High |
| Eat mainly plants | 52 | 87 | 95 |
| Hibernate from Oct to Feb | 15 | 65 | 94 |
| Build up most fat & water in spring | 7 | 50 | 91 |
| Summer sun can kill within hour | 2 | 32 | 73 |
| Are active any time after rainfall | 3 | 29 | 72 |
| Spend small % of time in burrows | 5 | 40 | 66 |
| Is the California state reptile | 14 | 43 | 63 |
| Typically longer than 20 inches | 30 | 36 | 62 |
| Do not need water to survive | 1 | 12 | 48 |
| Live to 100 years plus | 0 | 4 | 5 |

| Respondent Demographics | | Knowledge | | |
|-------------------------|----------|-----------|--------|------|
| | | Low | Middle | High |
| Sex | | | | |
| | Males | 26 | 45 | 29 |
| | Females | 42 | 44 | 15 |
| Age | | | | |
| | 18 – 29 | 39 | 46 | 15 |
| | 30 – 39 | 45 | 39 | 16 |
| | 40 – 49 | 30 | 46 | 25 |
| | 50 – 59 | 30 | 42 | 28 |
| | 60 – 69 | 30 | 54 | 16 |
| | 70 + | 8 | 44 | 48 |
| | Mean Age | 39.9 | 43.7 | 47.4 |

| Respondent Demographics | Knowledge | | |
|-----------------------------------|-----------|--------|------|
| | Low | Middle | High |
| Education | | | |
| High School or less | 45 | 45 | 10 |
| 2 year associate degree | 35 | 33 | 32 |
| 4 year college or advanced degree | 25 | 56 | 19 |
| Income | | | |
| < \$50,000 | 31 | 35 | 33 |
| \$50,000 – \$90,000 | 37 | 52 | 11 |
| \$90,000 – \$130,000 | 33 | 42 | 25 |
| \$130,000 + | 35 | 48 | 17 |
| Ethnicity | | | |
| Hispanic or Latino | 42 | 44 | 15 |
| Not Hispanic or Latino | 30 | 44 | 25 |

| Place of Residence | Knowledge | | |
|--------------------|-----------|--------|------|
| | Low | Middle | High |
| Needles | 18 | 5 | 77 |
| Palm Desert | 28 | 21 | 52 |
| Ridgecrest | 2 | 56 | 43 |
| Barstow | 26 | 45 | 29 |
| El Centro | 50 | 25 | 25 |
| Rancho Cucamonga | 46 | 35 | 19 |
| Indio | 12 | 69 | 19 |
| Lancaster | 21 | 61 | 17 |
| Yucca Valley | 8 | 77 | 15 |
| Fontana | 54 | 35 | 10 |
| Rialto | 65 | 31 | 4 |
| Victorville | 23 | 76 | 0 |

| Organizations | Knowledge | | |
|---------------------------|-----------|--------|------|
| | Low | Middle | High |
| OHV ownership | | | |
| Organizational Membership | | | |
| Environmental group | 20 | 24 | 56 |
| OHV organization | 39 | 40 | 21 |
| OHV ownership | | | |
| Motorcycle | 38 | 41 | 21 |
| ATV | 44 | 35 | 21 |
| Dune buggy | 34 | 44 | 21 |
| 4-wheel drive vehicle | 37 | 44 | 19 |
| Desert behavior | | | |
| Driven OHV in desert | 37 | 41 | 22 |
| Live in California desert | 30 | 44 | 26 |

| Awareness of / Encounters with Desert Tortoise | Knowledge | | |
|---|-----------|--------|------|
| | Low | Middle | High |
| Ever heard of the desert tortoise | 97 | 97 | 99 |
| Ever seen desert tortoise in the wild | 47 | 55 | 80 |
| Know anyone who has: | | | |
| picked up a desert tortoise in the wild | 31 | 26 | 19 |
| Taken a desert tortoise from the wild | 4 | 9 | 8 |
| Adopted a desert tortoise as a pet | 18 | 32 | 48 |
| Released pet desert tortoise into wild | 1 | 9 | 3 |

| Perceived threats to Desert Tortoise ¹ | Knowledge | | |
|--|-----------|--------|------|
| | Low | Middle | High |
| Disease | 59 | 63 | 68 |
| Habitat loss (Human dev. Agriculture) | 58 | 53 | 68 |
| Nature (Drought, Lack of food) | 54 | 54 | 66 |
| Pesticides / chemicals | 73 | 46 | 59 |
| Other animals (Dogs, Ravens, Cattle) | 32 | 45 | 51 |
| Humans (e.g., OHV, collecting) | 34 | 32 | 48 |

Variables coded (1) = not at all a threat to (7) = extreme threat

Cell entries are percents for moderate to extreme threats (5, 6 or 7)

| Primary threat to Desert Tortoise populations | Knowledge | | |
|--|-----------|--------|------|
| | Low | Middle | High |
| Habitat loss due to human development | 43 | 40 | 30 |
| Lack of nutritional food | 11 | 1 | 0 |
| Being eaten by ravens | 10 | 20 | 30 |
| Drought | 8 | 2 | 8 |
| Pesticides / chemicals | 7 | 2 | 4 |
| Road kill when crossing roads | 6 | 5 | 2 |
| Collecting by humans | 5 | 5 | 2 |
| OHVs unintentionally disturbing | 3 | 11 | 4 |
| Military training in the desert | 3 | 1 | 0 |
| Disease | 2 | 4 | 9 |

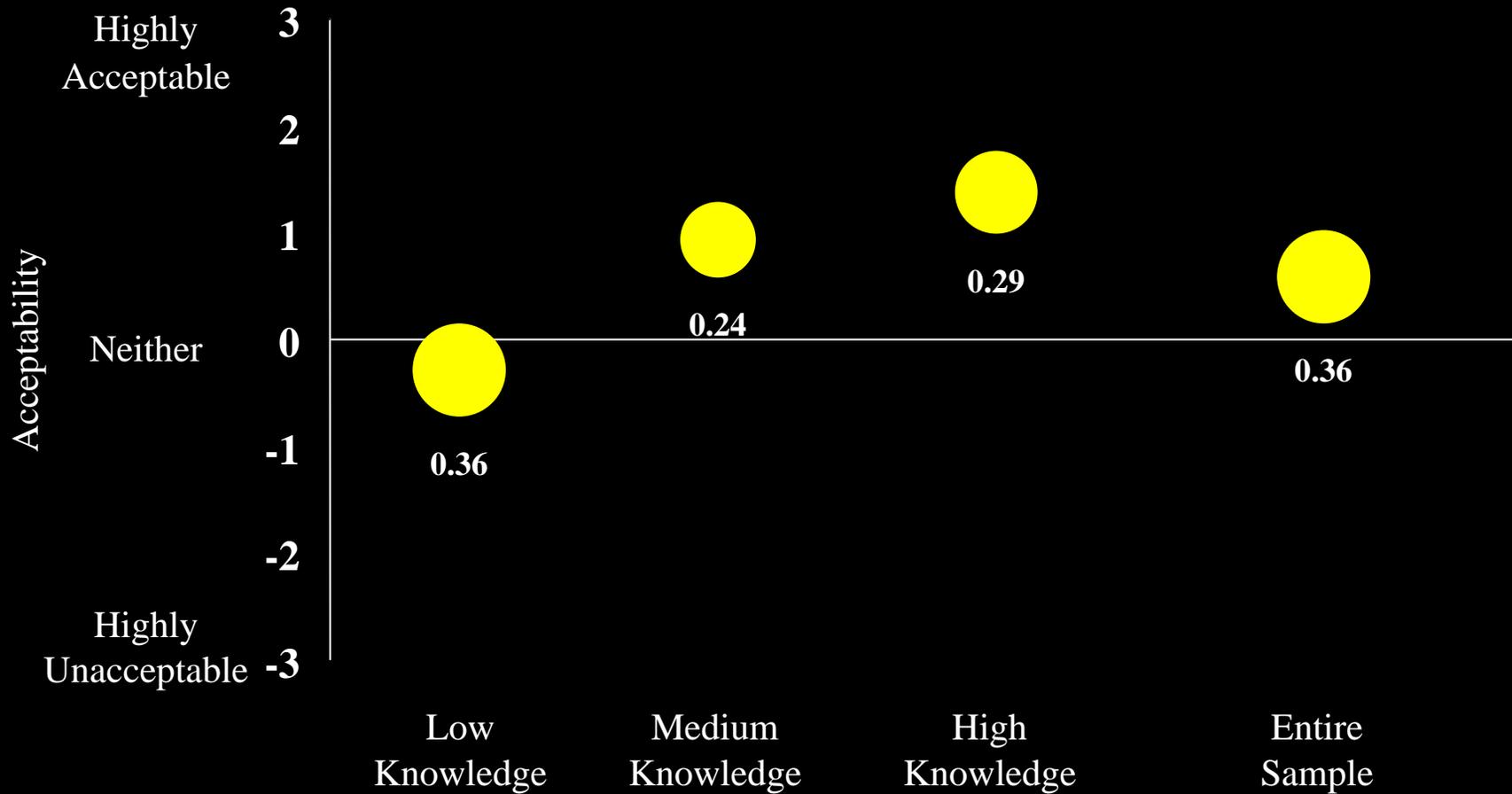
Acceptability of Management Actions

- Survey included 18 management actions
- Unacceptable to all respondents
“taking no action to protect the desert tortoise”
- Most acceptable: “enhance native food sources”
- Least acceptable: “limit or ban hikers”
- 10 actions varied from “negative” to “positive”
as knowledge increased ...

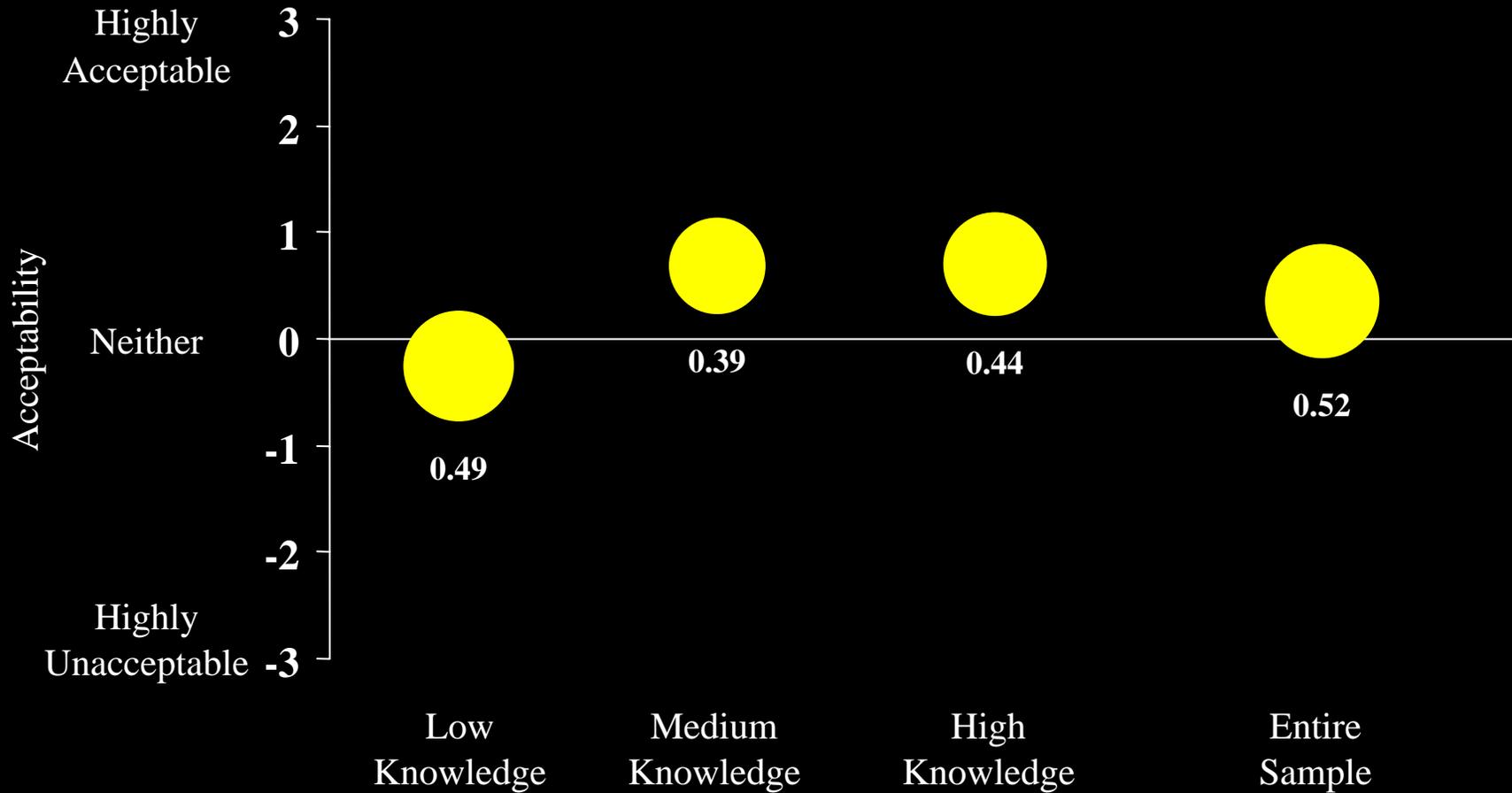
Acceptability of Management Actions varying Neg. to Pos. by Knowledge

- Vaccinate desert tortoises to control disease
- Fence roads to reduce road kills
- Eliminate ravens
- Eliminate feral dogs
- Limit new human development
- Ban cattle grazing
- Ban hunting
- Limit number of OHVs
- Ban OHVs
- Ban dual sport rides

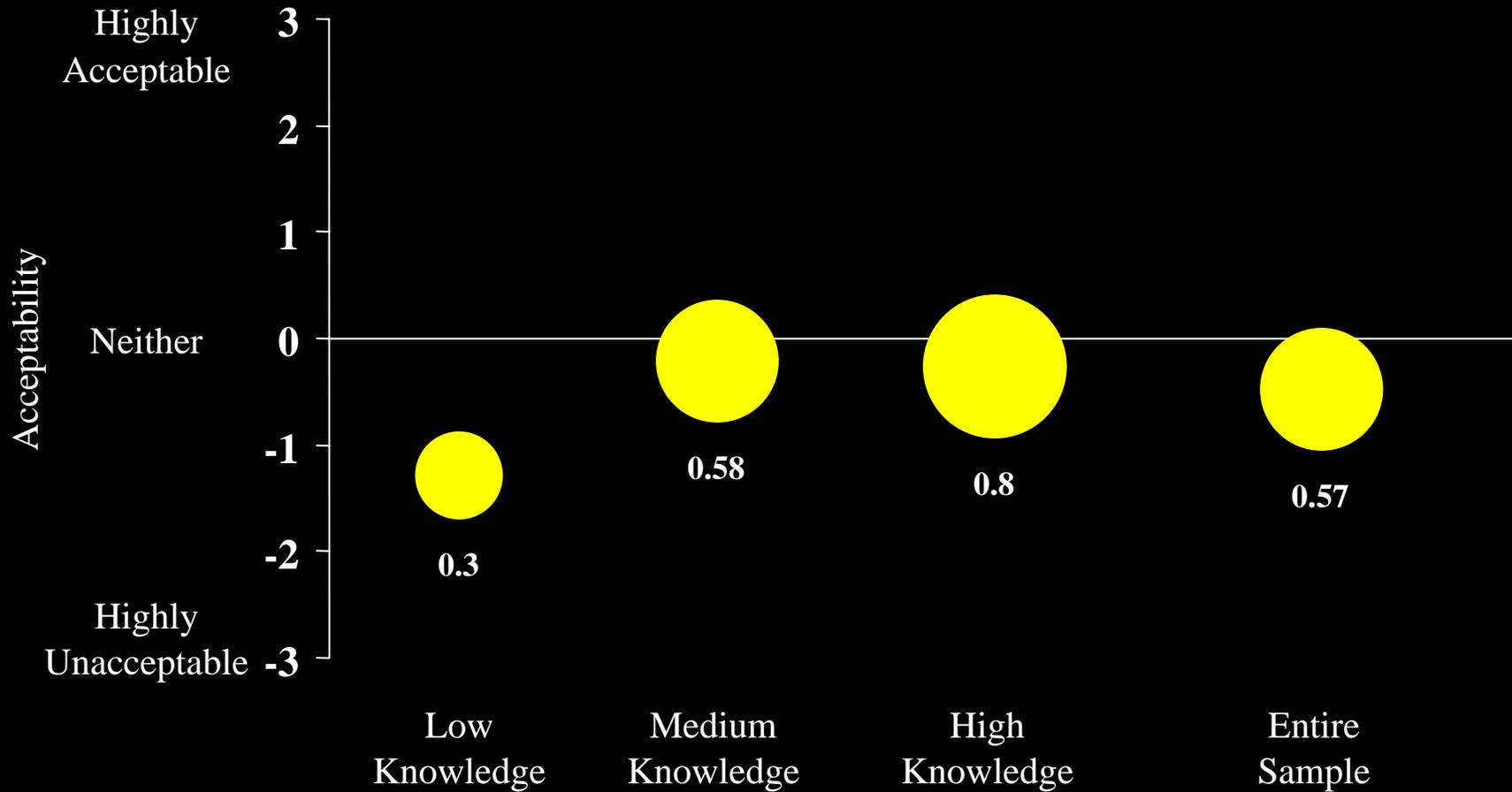
Vaccinate desert tortoises to control disease



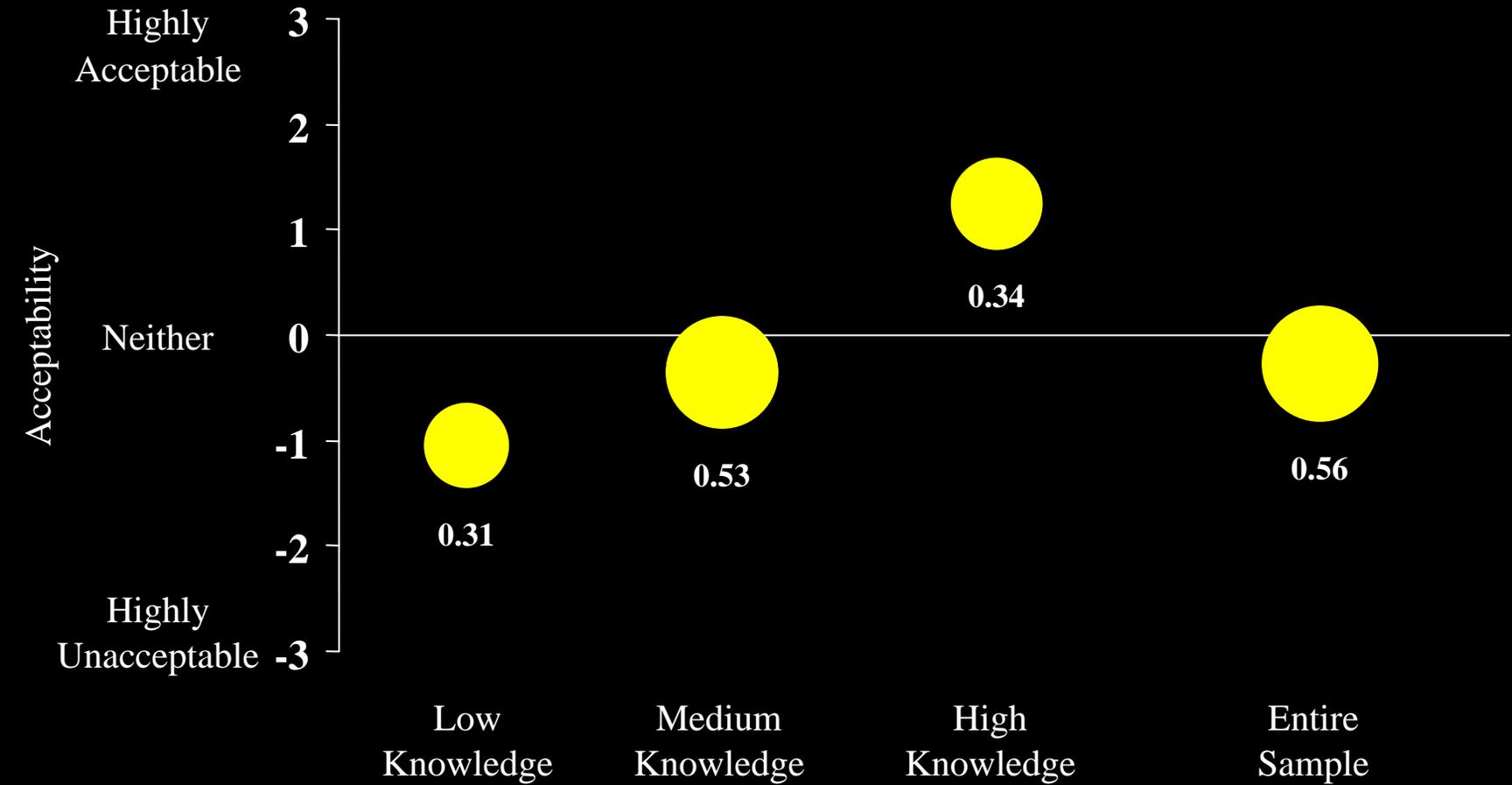
Fence roads to reduce road kills of desert tortoises



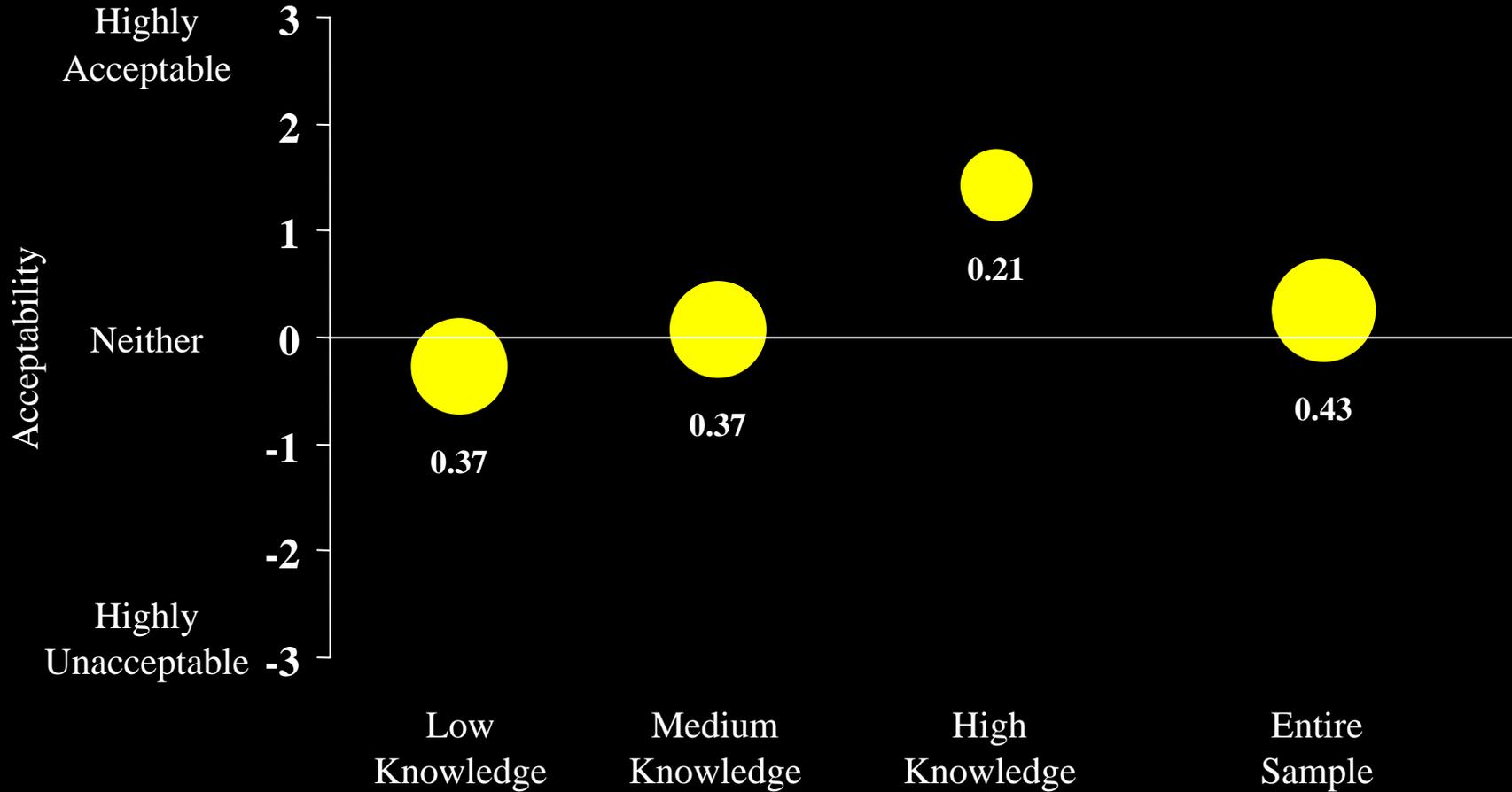
Enact season closures to all human activity



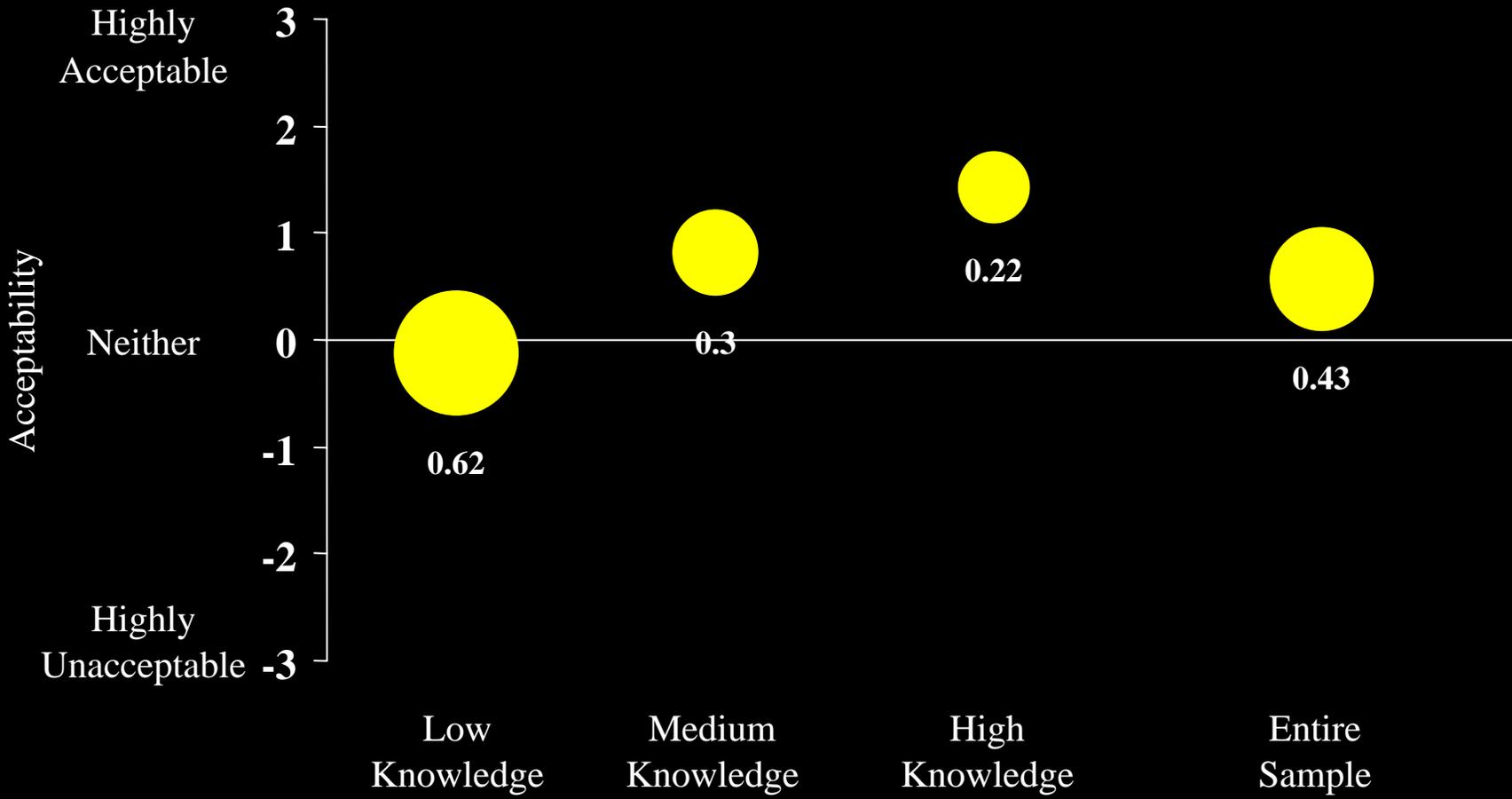
Eliminate ravens that threaten juvenile tortoises



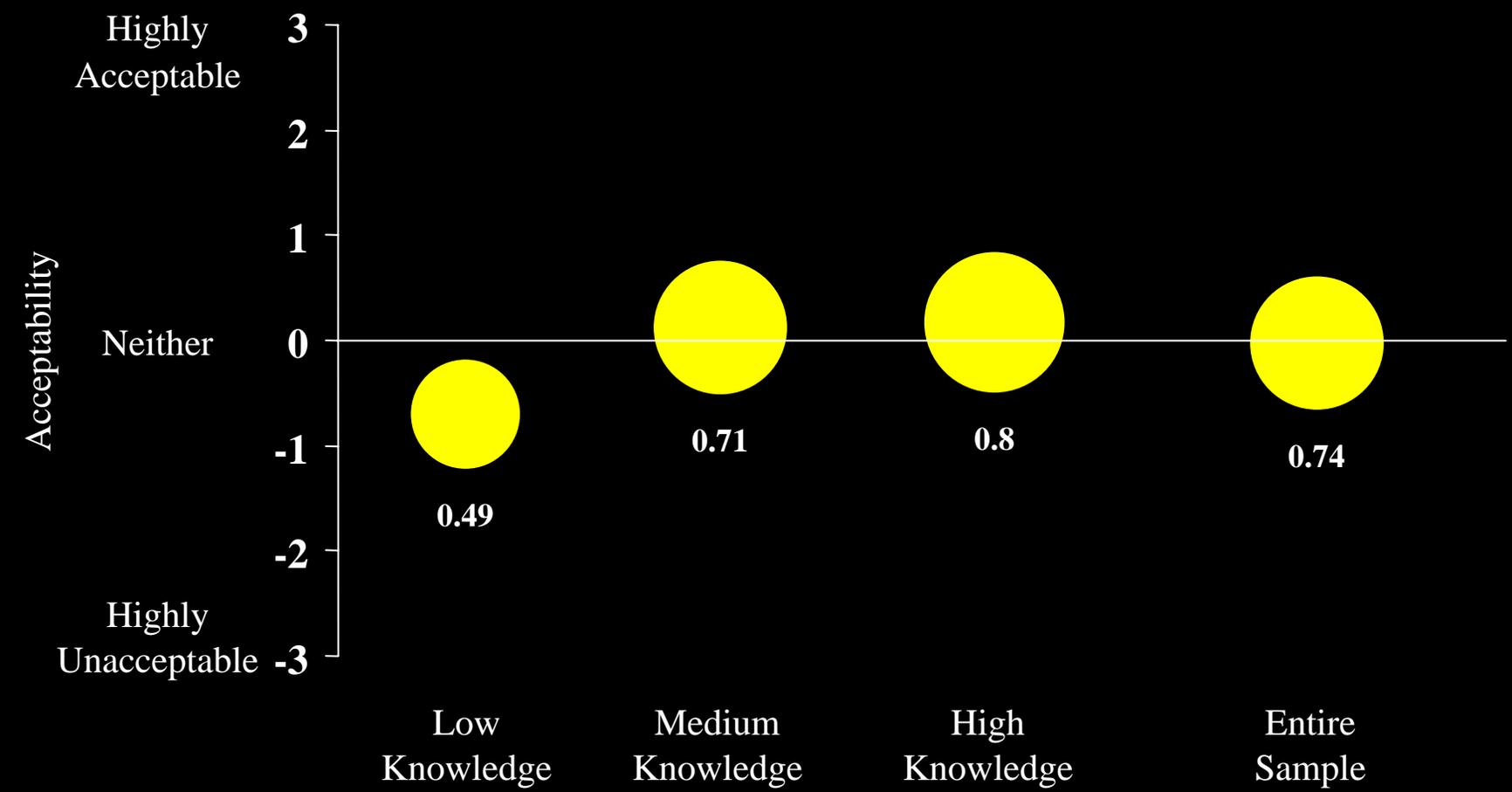
Eliminate feral dogs that threaten juvenile tortoises



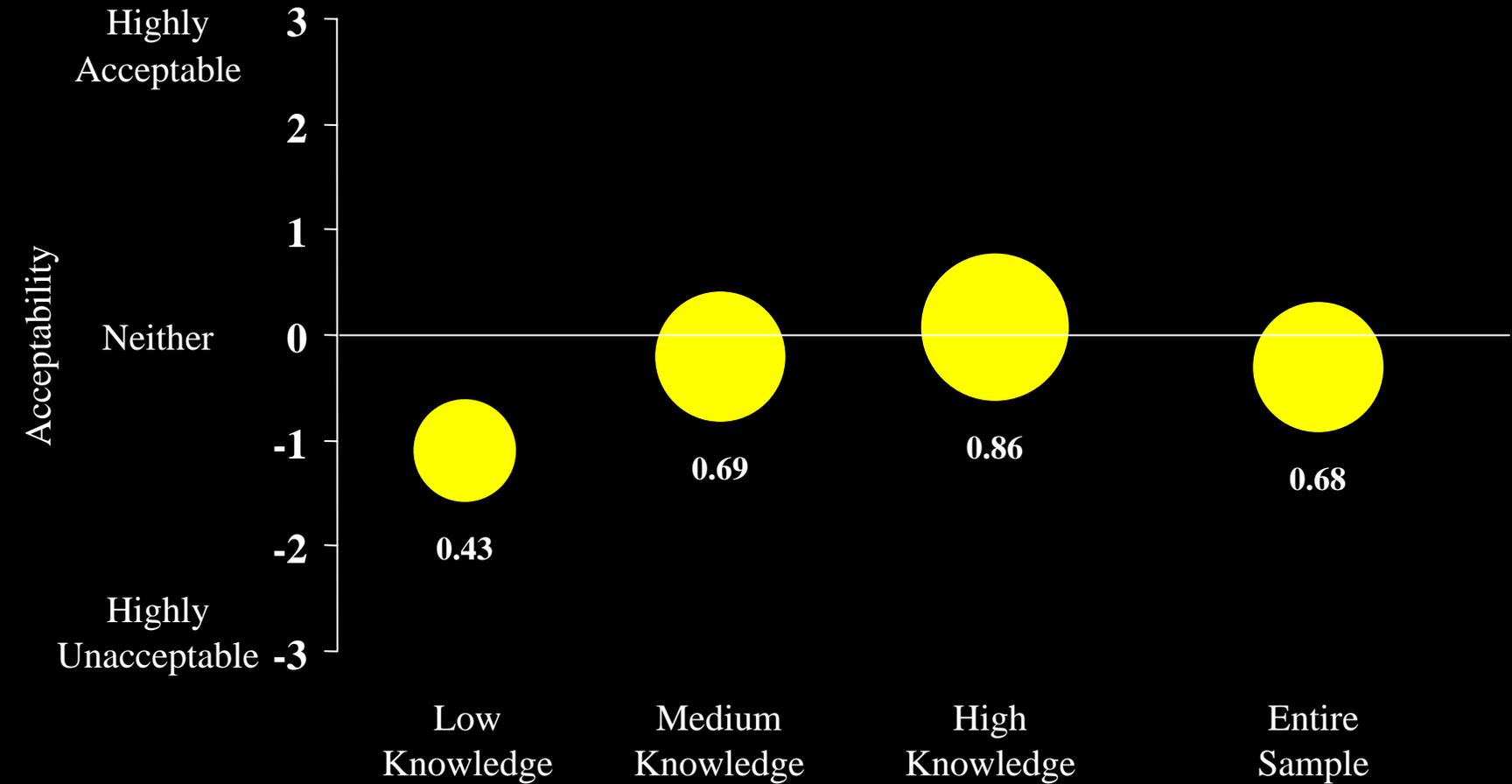
Limit new human development in desert tortoise habitat



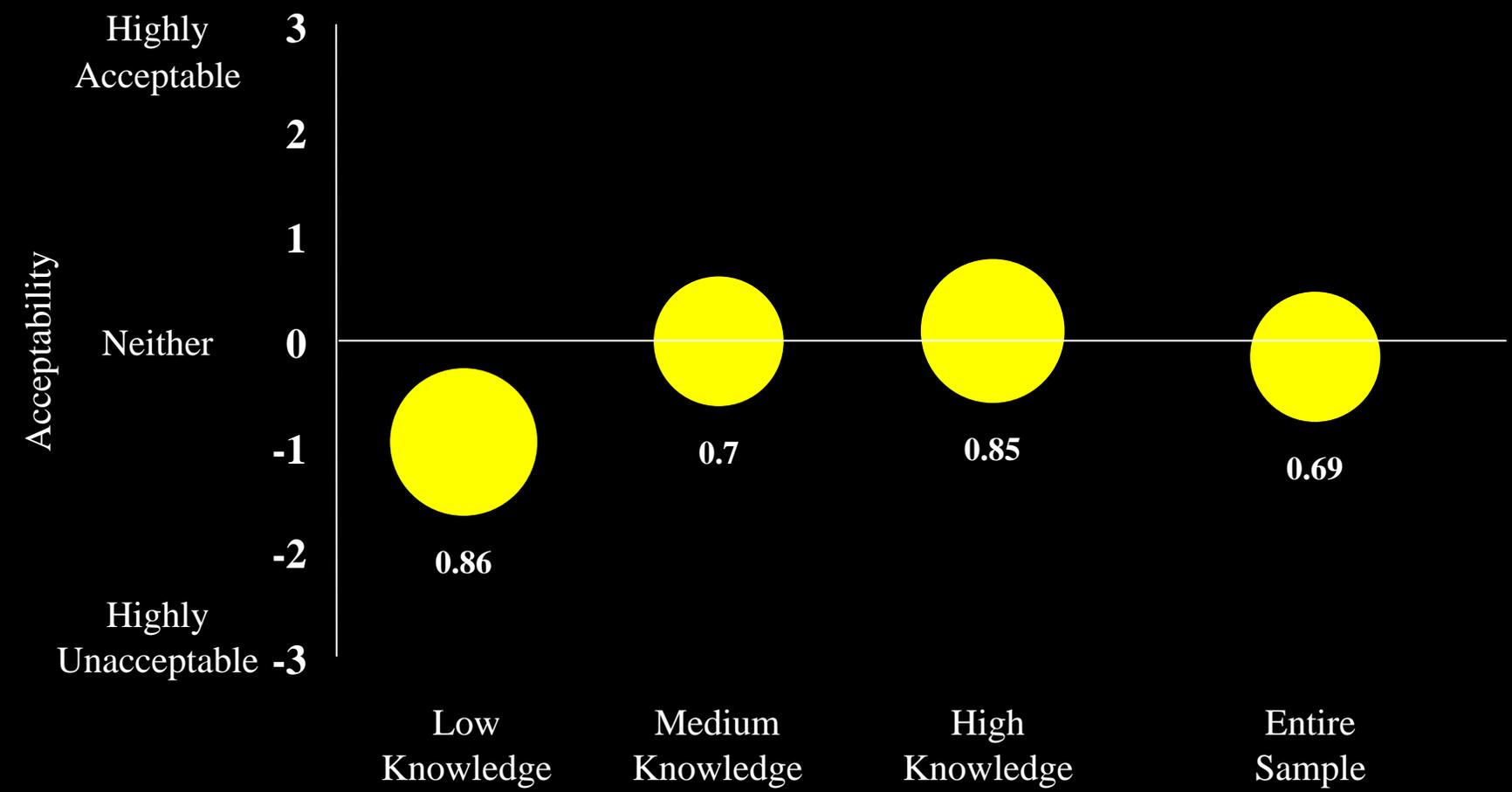
Limit the number of OHVs in some areas of desert tortoise habitat



Ban OHVs in some areas of desert tortoise habitat



Ban dual sport rides in some areas of desert tortoise habitat



| Beliefs, Attitudes and Support for Recovery | Knowledge | | |
|---|-----------|--------|------|
| | Low | Middle | High |
| Number of desert tortoises has declined (% agree) | 32 | 67 | 73 |
| Attitude toward desert tortoise (% positive) | 64 | 78 | 94 |
| Attitude toward desert tortoise recovery (% positive) | 64 | 76 | 86 |
| Support efforts to recover desert tortoise (% support) | 68 | 72 | 84 |

Hypotheses



Respondents with more knowledge will be:

- more aware of the consequences of their actions
- ascribe more responsibility to themselves
- more likely to change their behaviors

than those with less knowledge

Awareness of Consequences

- I am aware of the impact that humans have on the desert tortoise
- My personal actions can impact the ability of the tortoise to recover
- If I touch a desert tortoise, it could hurt the animal's ability to survive



Cronbach $\alpha = .88$

Ascription of Responsibility



- I feel a strong personal obligation to protect the desert tortoise
- It is my responsibility to protect the desert tortoise
- I feel an obligation to educate others about the importance of protecting the desert tortoise

Cronbach $\alpha = .92$

Behavioral Intentions



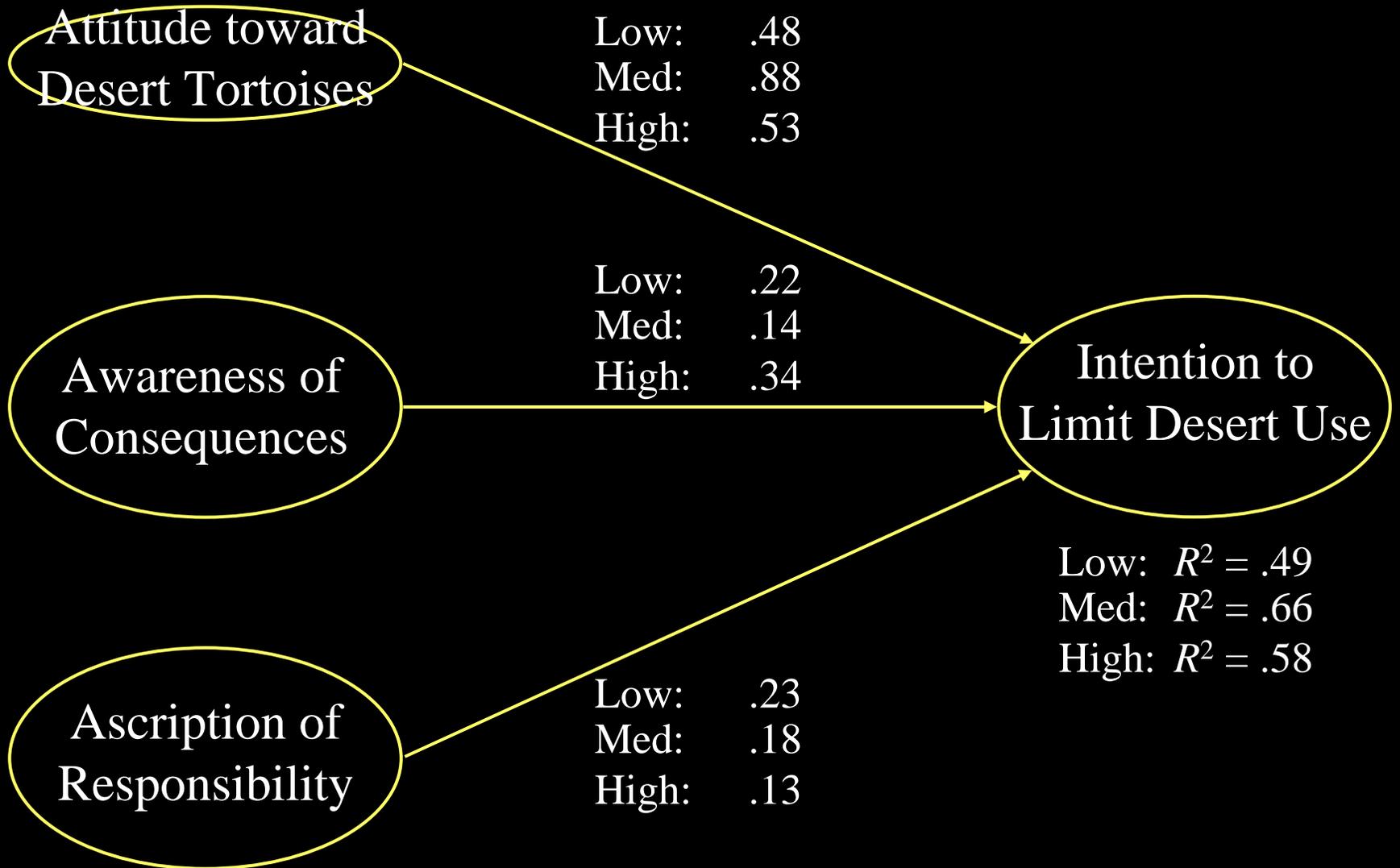
- I would be willing to *limit the number* of my visits to the desert to help protect the desert tortoise
- I would be willing to *limit the areas* I visit in the desert to help protect the desert tortoise
- I would be willing to limit my recreational use of the desert *during certain seasons* to help protect the desert tortoise

Cronbach $\alpha = .97$

| Concept | Knowledge | | | <i>F</i> -value | <i>eta</i> |
|------------------------------|-------------------|-------------------|-------------------|-----------------|------------|
| | Low | Middle | High | | |
| Awareness of consequences * | .83 ^a | 1.23 ^b | 2.03 ^c | 40.78 | .286 |
| Ascription of responsibility | -.11 ^a | .64 ^b | 1.89 ^c | 92.22 | .409 |
| Behavioral intention | -.28 ^a | .68 ^b | .86 ^c | 28.09 | .240 |

* Scale -3 = strongly disagree, +3 = strongly agree
 $p < .001$

Predicting Behavioral Intentions



Implications



- As attitudes toward desert tortoises become positive awareness of consequences (AC) and ascription of responsibility (AR) increase, individuals more likely to change their behavior to protect the desert tortoise
- Education efforts to influence attitudes, AC & AR are likely to:
 - facilitate protection of the desert tortoise
 - increase willingness to comply with mgmt. actions

Questions?

