

ANTHROZOÏS

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## Brief Measures of the Animal Attitude Scale

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**ABSTRACT** There is increasing interest among social and behavioral scientists in brief measures of attitudes and personality traits. Based on factor analysis and using an existing data set ( $n = 400$  adults), we constructed a 5- and a 10-item version of the widely used Animal Attitude Scale (AAS). Both versions were highly correlated with the original 20-item AAS ( $r_s > 0.95$ ,  $p < 0.001$ ), and both versions demonstrated acceptable reliability and validity. The AAS-5 and the AAS-10 have excellent psychometric properties and offer alternatives for researchers who need convenient and short measures of attitudes related to animal welfare.

**Keywords:** Animal Attitude Scale, animal ethics, attitude measurement, brief scales



Due to the increasing awareness of the importance of animals in human life, researchers have developed a variety of instruments designed to measure aspects of our relationships with other species. Wilson and Netting (2012) recently undertook a comprehensive examination of 140 English-language measures of human–animal interactions. These instruments ranged from measures of beliefs about bird feeding to frequency of experiences with animal cruelty. The majority (62%) of the scales they located, however, assessed aspects of relationships with pets, and much less attention has been given to assessing individual differences in attitudes toward the ethics of the use of other species. Many questions related to the psychological underpinnings of animal ethics can be addressed via attitude scales. These include, for example, the impacts of factors such as education, early experiences with pets or hunting, personality differences, social class and political ideology, beliefs about animal sentience, and the relationship between attitudes and behaviors (e.g., meat eating, involvement in animal protection).

The Animal Attitude Scale (AAS)<sup>1</sup> (Herzog, Betchart and Pittman 1991) is one of the most widely used measures of general attitudes toward

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animal protection. The original version of the AAS consisted of two subscales. The “Ethics Subscale” included 20 items which assessed attitudes to the treatment and use of animals (e.g., “It is unethical to breed purebred dogs for pets when millions of dogs are killed in animal shelters each year”). The “Take Action Subscale” consisted of nine items that focused on the degree to which people would be willing to engage in specific behaviors to save an animal or to facilitate animal welfare (e.g., “I would be unlikely to stop my car to help an injured dog”). Factor analyses of the original version of the AAS, however, revealed that all 29 items fell onto a single factor. Hence, in subsequent administrations, “take action” items were dropped, and the present version of the AAS consists, with minor modifications in wording, of the 20 ethics subscale items.

Originally developed for a study of sex role orientation and attitudes toward animal welfare issues, the AAS has subsequently been used to investigate other aspects of human–animal interactions. For example, the AAS has been used to study attitudes of German children toward animals (Binngießer, Wilhelm and Randler 2013), the impact of witnessing killing of animals (Daley and Morton 2008), the relationship between empathy and attitudes toward the use of animals (Taylor and Signal 2005; Daly and Morton 2009), attitudes of Chinese university students (Davey 2006), the relationship between ethical orientation and beliefs about animals use (Galvin and Herzog 1992), personality differences and animal attitudes (Mathews and Herzog 1997), dietary choices and views of animals (Ruby 2012), differences between animal protectionists and community members in Australia (Signal and Taylor 2006), and the relationship between disgust sensitivity and animal welfare attitudes (Herzog and Golden 2009).

The AAS has excellent psychometric properties. Cronbach's alphas typically range from 0.85 to 0.95. The scale's concurrent and convergent validity have also been established. AAS scores are positively correlated with the “Profit” subscale of Taylor and Signal's (2009) Pet, Pest, and Profit Scale ( $r = 0.83, p < 0.01$ ) and negatively correlated with Grayson's (2012) Speciesism Scale ( $r = -0.93, p < 0.001$ ). Animal protectionists score higher on the AAS than general community members (Taylor and Signal 2006), and members of animal use organizations score lower than people not involved in animal issues (Herzog and Golden 2009). The AAS predicts food choices, with vegetarians having significantly higher scores than non-vegetarians (Herzog and Golden 2009; Grayson 2012; Ruby 2012). AAS scores are also correlated with the importance that ethical concerns play in the decision of vegetarians to forgo eating animals (Herzog and Golden 2009).

While the AAS is a psychometrically sound instrument for measuring attitudes toward the use of nonhuman species, some researchers have found the 20-item version overly long, particularly in studies in which subjects take multiple scales in a single session. For example, in order to reduce the length of an online survey of attitudes toward animals of social workers, Faver and Muñoz (2014) created a 10-item version of the AAS. A 10-item adaptation of the AAS was used by Pearson, Dorrian and Litchfield (2011) to assess the effects of an environmental education program in a zoo setting. Bastian et al. (2012) used a 10-item version to study the effects of framing on moral concern for animals. A 6-item version of the AAS was recently used to study the effects of interacting with animals on the development of positive attitudes and behavior of children (Mueller 2014).

While researchers have found brief versions of the AAS useful, different researchers have created their own versions of the scale. For example, the version Faver and Muñoz (2014) used to study attitudes of social workers consisted of the 10 even-numbered items of the full AAS. We

felt there was need for standardized brief measures of attitudes toward the use of non-human species. Hence, our objective was to use factor analysis to systematically develop brief (10-item) and very brief (5-item) versions of the AAS having acceptable psychometric properties.

The use of shortened versions of established psychological measures has become common in the behavioral sciences. For example, traditional five-factor personality measures (the “Big Five”) contain between 40 and 240 items. Gosling, Rentfrow and Swann (2003), however, demonstrated that the five major domains of personality can be measured with reasonable accuracy with only 10 items. In their Ten-Item Personality Inventory (TIPI), each personality dimension is assessed by two questions. While the TIPI has slightly diminished psychometric properties, with over 1,300 citations in the past 10 years, it is widely accepted by personality researchers. In addition to personality, validity of brief scales has been established for other measures of individual differences. These include, for example, measures of work styles (Del Libano et al. 2010), perceptions of illness (Broadbent et al. 2006), the psychological state of “flow,” (Jackson, Martin and Eklund 2008), and depression (Henry and Crawford 2005). Note that concerns over the methodological limitations of shortened scales have been raised (see Konstabel et al. 2012). But as Smith, McCarthy and Anderson (2000) note, abbreviated forms of psychological scales can be developed that have acceptable psychometric properties. Anastasi (1988) stated that, generally speaking, longer tests are more reliable and valid than shorter tests; however, when a test is shortened by removing the least effective items, the shorter test may actually be an improvement.

## Methods

### *Participants*

The participants were a convenience sample of 400 American adults (60% male, 40% female). They were recruited through a variety of internet sources including Psychological Research on the Net, Lab-United, and through advertisements placed on websites such as Craigslist and Facebook. The mean age of the participants was 42 years ( $SD = 15.9$ ). Forty-eight percent of participants were from suburban areas, 43% were urban, and 9% were rural. The median income of the sample was \$66,000 (US dollars). Seventy-eight percent of the participants were Caucasian. As a group, they were highly educated: 57% had completed a graduate degree or attended graduate school and 24% had completed undergraduate degrees. In terms of political affiliation, 47% were Democrats, 16% were Independent, 11% were Republican, 3% were members of the Green Party, and 17% had no political affiliation. The participants had diverse religious views: 16% were agnostic, 14% were Jewish, 12% were atheists, 10% were Catholic, 10% were Protestant, and 16% indicated no religious affiliation. The participants identified their diets as follows: omnivore (70%), vegetarians (10%), vegan (8%), pescatarian (6%), “omnivore with vegetarian leanings” (4%), “omnivore with ethical considerations” (1%), other (1%).

### *Procedures*

The participants completed an on-line survey which included the 20-item Animal Attitude Scale, the 33-item Speciesism Scale, the 5-item Satisfaction with Life Scale (Diener et al. 1985), and a series of demographic questions. The Speciesism Scale was developed by Grayson (2012) to assess beliefs in human superiority and privilege over all other animal species. Sample items include “Humans are the most important species on earth” and “I am in favor of rights for non-human animals.” High scores on the scale indicate strong beliefs in

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human superiority. The Satisfaction with Life Scale measures global life satisfaction. It was included to assess divergent validity with the Speciesism Scale and was expected to be uncorrelated with Speciesism Scale scores.

*Construction of the AAS-10 and the AAS-5:* As noted above, the AAS was revised previously to establish a single-dimension measurement instrument, the focal concept being “animal use ethics.” Principle components analysis (PCA) was conducted to verify unidimensionality within the current data set and to yield component loadings for each item on this dimension. The data clearly met assumptions for PCA: the sample size of 400 is considered good to very good for correlational techniques in general, and the ratio of subjects (400) to variables (20) exceeds the most stringent recommendations for factor analysis: there were no missing cases nor was there evidence of outliers; skewness (-0.137) and kurtosis (-0.780) were well within acceptable limits; results of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (0.953) and Bartlett’s Test of Sphericity ( $p < 0.001$ ) were also clearly acceptable.

The results of the PCA are shown in Table 1. Though three components had eigenvalues greater than 1.0, the results indicated that component #1 explained most of the variance (almost 50%). A clear break occurred between components #1 and #2, and the remaining components trailed off gradually without a visible break. Further, examination of the component loadings for each item showed that all 20 items loaded most highly on component #1. All 20 had loadings greater than the traditional cut-off of 0.4, and 19 of the 20 had loadings greater than 0.6. Examination of item loadings on component #2 showed only a single item greater than 0.4, and there were only two items with loadings greater than 0.4 on component #3. (Note that none of these items was ultimately selected for either of the short forms.) Thus, we were comfortable in proceeding based on the assumption of a unidimensional parent scale.

Items were chosen for the short forms using a hybrid approach in which psychometric properties (primarily to enhance reliability) were balanced with item content (primarily to enhance convergent validity). As can be seen in Table 1, the 20 items on the parent form were first ranked by component #1 loading, in descending order. The direction of scoring (forward or reversed) was noted, as was the item content. To maximize internal consistency we selected items first based on component loading, but we also chose to balance scoring direction as well as to avoid redundant content. While “animal use ethics” is clearly the core construct measured by the AAS, the contexts in which it is applied cover a wide range of issues (e.g., breeding animals for food or fur, pet-keeping, hunting for food or sport, medical research, product safety research, and keeping animals in zoos). We realized that focusing solely on psychometric properties could very easily result in a final item set with limited contextual variation. This approach, while achieving maximum reliability, would diminish convergent validity and the usefulness of scales as a measure of general attitudes toward the use of other species.

Table 1, then, exhibits the exact decision-making process involved in item selection. Considering just the AAS-10, we can see that the first three items were chosen based on component loadings. The 4th and 5th ranked items were skipped as redundant (medical research), the 6th ranked was selected, the 7th was rejected as redundant, the 8th was selected, the 9th was rejected as redundant, the 10th was selected, and the 11th was rejected because at this point five of the items selected had been reverse-scored, so the remainder needed to be forward-scored. The 12th item was rejected based on a unique content consideration. At this point in the item selection process, with four items left to select, major contextual domains had been covered, with several remaining: rodeos/circuses, zoos, hunting,

**Table 1.** Criteria evaluated in selecting items for the short scales.

Loading Rank #	AAS-20 Item #	Component/Loading			Scoring Direction	AAS-10 Item #	AAS-5 Item #	Content Category
		1	(2)	(3)				
1	2	0.843	-0.255	0.068	R	2	2	Medical research
2	8	0.809	-0.194	-0.164	R	3	3	Food
3	14	0.790	0.155	-0.058	R	7		Skins (breeding for)
4	16	0.788	-0.387	0.043	R			Medical research
5	7	0.773	-0.231	-0.048				Medical research
6	9	0.758	0.047	0.193	R	4		Human moral dominance
7	6	0.743	-0.208	0.003	R			Food
8	19	0.719	-0.011	-0.120		10		Cosmetic safety testing
9	13	0.713	-0.071	0.449	R			Human moral dominance
10	15	0.707	-0.359	-0.104	R	8		Dissecting for education
11	5	0.705	-0.269	-0.209	R			Hunting (for food)
12	20	0.690	0.304	-0.294				Rodeos and circuses
13	18	0.686	0.280	0.151	R			Food
14	11	0.668	0.321	-0.064		6	5	Zoos
15	1	0.660	0.324	-0.207		1	1	Hunting (for sport)
16	12	0.643	-0.057	0.468	R			Human moral dominance
17	4	0.639	0.223	-0.236				Skins (trapping for)
18	17	0.634	0.109	-0.324		9		Pets
19	10	0.603	0.247	0.321		5	4	Slaughter of whales and dolphins
20	3	0.458	0.431	0.229				Cockfighting

pets, whales/dolphins, and cockfighting. We decided that zoos, hunting, pet keeping, and whale/dolphin slaughter were more salient contexts than rodeos/circuses, so we skipped this item and continued the previous strategy otherwise. The AAS-5 items were chosen based on a very similar approach, prioritizing the component loading, balancing the scoring direction, and covering major context domains in which animal ethics considerations are relevant. The final items for the AAS-10 and AAS-5 are listed in Appendix 1.

## Results

### *Psychometric Properties*

*Reliability and Validity:* All three versions of the AAS had acceptable reliability. Cronbach's alpha was 0.94 for the full AAS, 0.90 for the AAS-10, and 0.82 for the AAS-5. Correlations between both brief scales and the full AAS were high: AAS-10 ( $r = 0.98, p < 0.001$ ), AAS-5 ( $r = 0.95, p < 0.001$ ). The convergent validity as measured by correlations of the brief scales with the Speciesism Scale in the same administration was also high: AAS-10 ( $r = -0.92, p < 0.001$ ), AAS-5 ( $r = -0.89, p < 0.001$ ).

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## Dietary Differences

Two hundred and eighty-one of the participants characterized their diet as “omnivore” and 117 fell into the other dietary groups (“vegetarian,” “vegan,” “omnivore with ethical considerations,” etc). Because of the small numbers of participants in some of the dietary categories, for the purposes of analysis, we grouped the participants into two categories: “omnivore” and “other.” Self-identified “omnivores” scored lower on both brief versions than individuals in the “other” category: AAS-10 Omnivore  $M = 29.3$  ( $SD = 7.7$ ), “Other”  $M = 38.9$  ( $SD = 9.5$ ) ( $t_{(396)} = 9.678$ ,  $p < 0.001$ ,  $d = 1.110$ ); AAS-5 Omnivore  $M = 16.4$  ( $SD = 4.3$ ), “Other”  $M = 22.0$  ( $SD = 3.4$ ) ( $t_{(396)} = 5.587$ ,  $p < 0.001$ ,  $d = 1.447$ )

## Sex Differences

Nearly all administrations of the 20-item AAS have found that women are more concerned with animal protection than men (e.g., Herzog, Betchart and Pittman 1991; Signal and Taylor 2007; Daly and Morton 2008; Binnigießer, Wilhelm and Randler 2013). This was true of both brief versions of the AAS: AAS-10 Male  $M = 28.9$  ( $SD = 8.3$ ), Female  $M = 34.3$  ( $SD = 7.9$ ) ( $t_{(397)} = 6.572$ ,  $p < 0.001$ ,  $d = 0.667$ ); AAS-5 Male  $M = 16.2$  ( $SD = 4.6$ ), Female  $M = 19.3$  ( $SD = 4.5$ ) ( $t_{(397)} = 6.649$ ,  $p < 0.001$ ,  $d = 0.681$ ).

## Discussion

The AAS-10 and the AAS-5 are psychometrically robust short measures of attitudes toward the use of animals. Both the 5- and 10-item versions correlate very highly with the 20 item AAS. And both versions have acceptable reliability (Cronbach’s alphas  $> 0.80$ ), though the reliability of the 10-item scale is somewhat better than that of the AAS-5.

Credé et al. (2012) argue that use of one or two items to measure individual personality domains can compromise the validity of brief scales due to the increased probability of random measurement error. And because of content deficiency, they may have lower criterion validity. However, given the extremely high correlations between both short scales and the 20-item AAS, this criticism does not apply to the AAS-5 and AAS-10. Further, Credé et al. found using even slightly more items raised the reliability and validity of brief personality scales to the acceptable range. These findings also apply to our brief versions of the AAS in that 5 and 10 items rather than 1 or 2 items are used to measure a constellation of attitudes that has a single dimension.

To conclude, the AAS-5 and the AAS-10 are reliable and valid measures of general attitudes toward the human use of other species. Our general belief is that, other things being equal, longer scales are preferable to brief and very brief forms. Hence, if time is not a constraint, researchers should consider using the long form of the AAS. If, however, participants are pressed for time or if the measurement of animal attitudes is embedded in a matrix of other measures, these brief forms of the AAS offer psychometrically sound measures of attitudes toward the use of other species by humans.

## Note

1. The full 20-item AAS can be downloaded at: <http://paws.wcu.edu/herzog/AnimalAttScale.pdf>.

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Brief Measures of the Animal Attitude Scale

## Appendix 1. Animal Attitude Scale: 5- and 10-item versions.

The AAS-10 consists of all the items below. The AAS-5 consists of the items in bold print. Higher scores indicate more concern for animal welfare. The numbers of points assigned to the response items are in parentheses. Starred items (\*\*) are reverse scored.

*Instructions:* Listed below are a series of statements regarding the use of animals. Circle the letters that indicate the extent to which you agree or disagree with the statement:

SA = Strongly Agree (5), A = Agree (4), U = Undecided (3), D = Disagree (2), SD = Strongly Disagree (1)

**1. It is morally wrong to hunt wild animals just for sport.**

SA A U D SD

**2. I do not think that there is anything wrong with using animals in medical research.\*\***

SA A U D SD

**3. I think it is perfectly acceptable for cattle and hogs to be raised for human consumption.\*\***

SA A U D SD

4. Basically, humans have the right to use animals as we see fit.\*\*

SA A U D SD

**5. The slaughter of whales and dolphins should be immediately stopped even if it means some people will be put out of work.**

SA A U D SD

**6. I sometimes get upset when I see wild animals in cages at zoos.**

SA A U D SD

7. Breeding animals for their skins is a legitimate use of animals.\*\*

SA A U D SD

8. Some aspects of biology can only be learned through dissecting preserved animals such as cats.\*\*

SA A U D SD

9. It is unethical to breed purebred dogs for pets when millions of dogs are killed in animal shelters each year.

SA A U D SD

10. The use of animals such as rabbits for testing the safety of cosmetics and household products is unnecessary and should be stopped.

SA A U D SD